MODERN PLASTICS

JANUARY 1953

It's time to take a new look at the "working" plastics

The list of materials you could profitably use for a given product or part six months ago may be obsolete now.

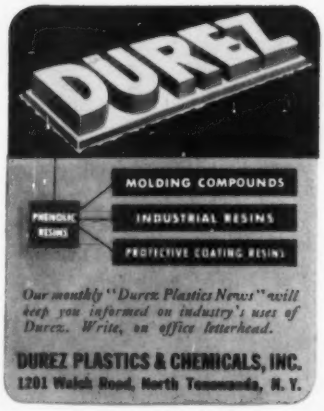
In the field of phenolic plastics alone, recent Durez developments can offer you savings in production and assembly costs, improved product service, and greater salability.

A re-survey of the materials picture will show you, for example, that parts to be *metal plated* can now be molded from a new Durez phenolic having excellent physical properties. If you never used plastics because the service your products undergo is "too rough," we have another new material with impact strength as high as 20 foot-pounds per inch (Izod). This is more than double the impact you could get heretofore.

Perhaps you manufacture electrical devices using silver contacts? We have a new phenolic that eliminates the problem of contact corrosion.

These and other results of our continuing plastics research can be utilized conveniently. Custom molders of Durez can serve you from the rough-drawing stage on in... can deliver finished moldings that meet your most exacting tests.

Our field technicians are at your service. Just write.


DUREZ
MOLDING COMPOUNDS
PHENOLIC RESINS
INDUSTRIAL RESINS
PROTECTIVE COATING RESINS
Our monthly "Durez Plastics News" will keep you informed on industry's uses of Durez. Write, on office letterhead.
DUREZ PLASTICS & CHEMICALS, INC.
1201 Walck Road, North Tonawanda, N. Y.

PHENOLIC PLASTICS THAT FIT THE JOB

Introducing
ESQUIRE'S
High, Wide and Handsome
FOOTMAN

A *Shining* Example
of Molded
Catalin
STYRENE

Catalin HIGH-IMPACT STYRENE *makes* this new bootery two pounds lighter, sturdier, smarter and more sales-appealing than its wood predecessor

Structurally, this ESQUIRE Footman De Luxe posed a challenge to both plastic material and molder*. The specifications were to *save* weight and at the same time *bear* weight. The incentive was to reduce shelf thicknesses and enlarge the storage space for supplies. The desire was to improve upon this facility's appearance and to achieve a compact, structurally-strong, portable assembly.

Through sound plastics engineering, good design and the use of High-Impact CATALIN STYRENE, all objectives were accomplished. We at Catalin, together with the molder and marketer, share in the satisfaction of another tough job . . . well done!

*Custom molded for Knomark Mfg. Co., Inc., Brooklyn, N. Y. by Majestic Molded Products, Inc., Bronx, N. Y.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N. Y.
CATALIN

In addition to Styrene Molding Compounds, Catalin chemical products include a wide range of Urea, Phenolic, Cresylic, Resorcinol, Melamine and Styrene Resin formulations.

MODERN PLASTICS*

JANUARY 1953 VOL. 30, NO. 5

CONTENTS

GENERAL SECTION

What We Must Do in 1953 (Editorial) 5

Plastics Industry Trends 55
Big upsurges in the industry, starting in mid-year, indicate that the over-all picture will show an increase over the previous year

Materials Supply and Demand 57
Reviewing the situation during 1952 of the following plastics:

- **Phenolics** 57
- **Urea and Melamine** 59
- **The Vinyls** 60
- **Polystyrene** 64
- **Cellulosics** 65
- **Polyethylene** 66
- **Acrylics** 67
- **Coumarone** 68

Application Trends in 1952 69
Renewed activity in all branches of the industry made the year one of plenitude, progress, and promise

Why Bell & Howell Uses Butyrate 75
Plastics materials made possible new concepts of construction and styling in the design of new and compact motion picture projector

Ford Seat Cushions are Noiseless 78
Tension wires in cushion assembly are dip-coated with vinyl plastisol to provide protection against moisture and air

Dish Washing Eliminated 80
Smooth and attractive surface of plastic on paper plate liners reduces restaurant costs by eliminating dish washing problems

Plastics Products 82
New uses of plastics in consumer items

Flame Retardant Thermoplastics 148

Acids in a Box 151

Cloth-Patterned Vinyl Film 152

In Three Dimensions 154

Food Slicer 156

Plans for Fluorocarbons 157

German Plastics Exhibition 162

PLASTICS ENGINEERING

Engineering Progress in 1952 87
Engineering developments of the year are described in condensed versions

Machines for Thermoplastics 109
Shipments of injection and extrusion machinery, both domestic and export, during 1952

TECHNICAL SECTION

The Year 1952 in Review 111
Plastics progress surveyed and analyzed, with extensive references to the published literature

DEPARTMENTS

Plastics Digest 128

U. S. Plastics Patents 134

Books and Booklets 140

New Machinery and Equipment 146

THE PLASTISCOPE 200
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

Modern Plastics, published monthly by Breskin Publications, Inc., at Emmett St., Bristol, Conn. Executive and Editorial Office: 575 Madison Ave., New York 22, N. Y. Entered as second class matter at the Post Office at Bristol, Conn., December 14, 1950, under the Act of March 3, 1879. Copyright 1952 by Breskin Publications, Inc. All rights reserved. Subscription $6.00 a year, $11.00 for two years, $15.00 for three years in the U.S., its possessions, South America, and Canada. All other countries $8.00 a year, $13.00 for two years, $17.00 for three years, payable in U.S. currency. Price of this issue 75 cents per copy in the U. S., its possessions, South America, and Canada; all other countries $1.00. Printed in the U.S.A. by the Hildreth Press, Inc., Bristol, Conn.

*Reg. U.S. Pat. Office

Another new development using

B. F. Goodrich Chemical *raw materials*

Vinyl sponge serves the Washington Redskins. Players left to right: Gene Brito, Charlie Justice, John Williams, Neil Ferris.

LESS "OUCH" FOR FOOTBALL PLAYERS

FOOTBALL PLAYERS are going to like this new vinyl sponge "guard" made from Geon vinyl resin. Taped over areas of the body to be protected, it does a beautiful job of saving the player's hide.

Just as important as the safety and comfort factors are the other advantages the manufacturer found that Geon gives this sponge. Lighter in weight than foam rubber, the sponge won't deteriorate from the soaking it gets from perspiration and rubbing oils. Pads are easily cleaned for re-use, since the vinyl sponge doesn't absorb odor, perspiration or oil. It wears well and doesn't harden upon aging, a common problem with foam rubber.

Geon paste resin, the base material used to make this plastic sponge, is also used for other sponge products such as fish floats, life rafts and boat bumpers. And it is used for many non-sponge-type products—can be molded, coated, cast or dipped.

In Geon materials you will find a wide range of qualities . . . resistance to heat and cold, aging, many chemicals and abrasion. They may help you develop or improve a product to bring in more sales. For helpful technical information, please write Dept. GB-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

CROSLEY
Air Conditioning
and
CHICAGO MOLDED PLASTICS

Here, again, molded plastics play an important part in both the appearance and the utility of a product. This time it's a new Crosley Air Conditioning Unit . . . designed to filter, purify, dehumidify and circulate air with or without cooling . . . built primarily for home use. The handsome, durable, decorator-styled grille is molded of a high-impact polystyrene in a soft pastel shade to harmonize with almost any color scheme.

The molding is a two-operation job . . . frame from one mold . . . louvres from a combination mold. The louvres at the left are individually adjustable so air may be directed up or down or in more than one direction.

◆ ◆ ◆ ◆

If you manufacture air conditioning units, molded plastics are sure to be in the picture, today or in the near future. And you'll find it good business to put Chicago Molded in this picture, too. For here your job will be in the hands of capable technicians and production men with unusual experience. Take cabinets, for instance. We've molded thousands of them during the past 33 years . . . all types and sizes including the largest made. We're used to long runs in large volume, and this applies even to the biggest ones.

We mold all materials, thermosetting and thermoplastic. We can provide the molding method best suited to your job . . . compression, injection or transfer. And we can make deliveries to meet your own production schedules.

That's why Crosley . . . and hundreds of other industrial leaders . . . like to do business with Chicago Molded. And why you, too, will find it profitable to discuss plans with a Chicago Molded engineer. Just write, wire or phone. There's no obligation.

CHICAGO MOLDED PRODUCTS CORPORATION

CUSTOM MOLDERS OF ALL *Plastics*

1046 NORTH KOLMAR AVENUE • CHICAGO 51, ILLINOIS

President and Publisher
CHARLES A. BRESKIN

Editorial Staff
Editor: HIRAM MCCANN
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Senior Editor: R. L. VAN BOSKIRK
Managing Editor: A. PAUL PECK
Art Director: DONALD R. RUTHER
Associate Editor: JOEL FRADOS
Midwestern Editor: VAL WRIGHT
Readers Service Editor: P. P. PHILIPSON

Business Staff
Vice President and General Manager: ALAN S. COLE

P. H. Backstrom — B. W. Gussow
M. A. Olsen — W. F. Kennedy
J. M. Connors — J. C. Galloway
R. C. Beggs — S. S. Siegel

Asst. Gen. Manager: PHILIP W. MULLER
Promotion Manager: HERBERT FRIEDMAN
Production Manager: DANIEL M. BROADS
Asst. Production Manager: B. J. FARINA
Production: SEYMOUR S. SCHWARTZ
Asst. to Publisher: THEODORE B. BRESKIN

Circulation Department
Circulation Mgr.: ROBERT B. BIRNBAUM

Executive and Editorial Offices
575 Madison Ave., New York 22, N. Y.
Tel., PLaza 9-2710

Branch Offices
Chicago 11: 101 E. Ontario St.
J. M. Connors Tel., Delaware 7-0060
Cleveland 14: 815 Superior Ave.
R. C. Beggs Tel., SUperior 1-0737
Los Angeles 17: 816 West Fifth St.
J. C. Galloway Tel., Mutual 8335
England: 10/12 Broad St. Ave., Blomfield St., London, E. C. 2
L. H. Dolaro Tel., London Wall 4231
Italy: Via Campigli 115 Varese-Masnago, Milan
G. Bagnati Tel., 2430
Germany: Wittelsbacher Allee 60 Frankfurt Am Main
G. J. Linder Tel., 46 143/46 372

Member Audit Bureau of Circulations. Member Associated Business Publications. MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

MODERN PLASTICS is fully protected by copyright and nothing that appears in it may be reprinted wholly or in part without first securing special permission.

EDITORIAL

What We Must Do In 1953

The year 1952 was an eventful one in plastics. More plastics were available. Better plastics came into being. Techniques advanced.

By alloying and copolymerizing styrene with other resins, a whole new tribe of plastics was developed. By extrusion and vacuum forming, a whole new economy of application was worked out. By impregnation and loading of reinforcements, greater speed and accuracy were brought to reinforced plastics. By the marriage of phenolics to specialized resins such as the epoxies, new properties in plastics were made available. By "layer molding," higher speeds of compression deliveries and better use of both fixed and working capital were evolved. By combining and registering printing with embossing, new effects and improved qualities in vinyl end products came to the market. By a complete new approach to color in both thermoplastics and thermosets, new markets were opened. By continued attention to quality and soundness of application, the prestige of the industry was enhanced.

The year 1952 was a year of accomplishment, and a year of good business.

But, in general, the application bases of the different resins were not broadened. The vinyls, the polymerized styrenes, the acrylics, the cellulosics, the thermosets, the high pressure laminates, and the reinforced plastics continued along conventional lines.

Increased availability of almost all plastics is going to necessitate in 1953 a broadened base of application for each and every one of them. We need new thinking about new markets in addition to planning for the expansion of those already opened.

We need thinking about the furniture field—about school desks and kitchen cabinets and bathroom fixtures and living room units. We need new thinking about the construction field—about gutters and downspouts and stairs and roofs and fenestration and piping and air conditioning. We need new thinking about the packaging field—about practical foams and sadly needed electronically-sealable films and tray packages and coatings and some means of mass-producing at a sound price plastic pill boxes, food containers, and similar items.

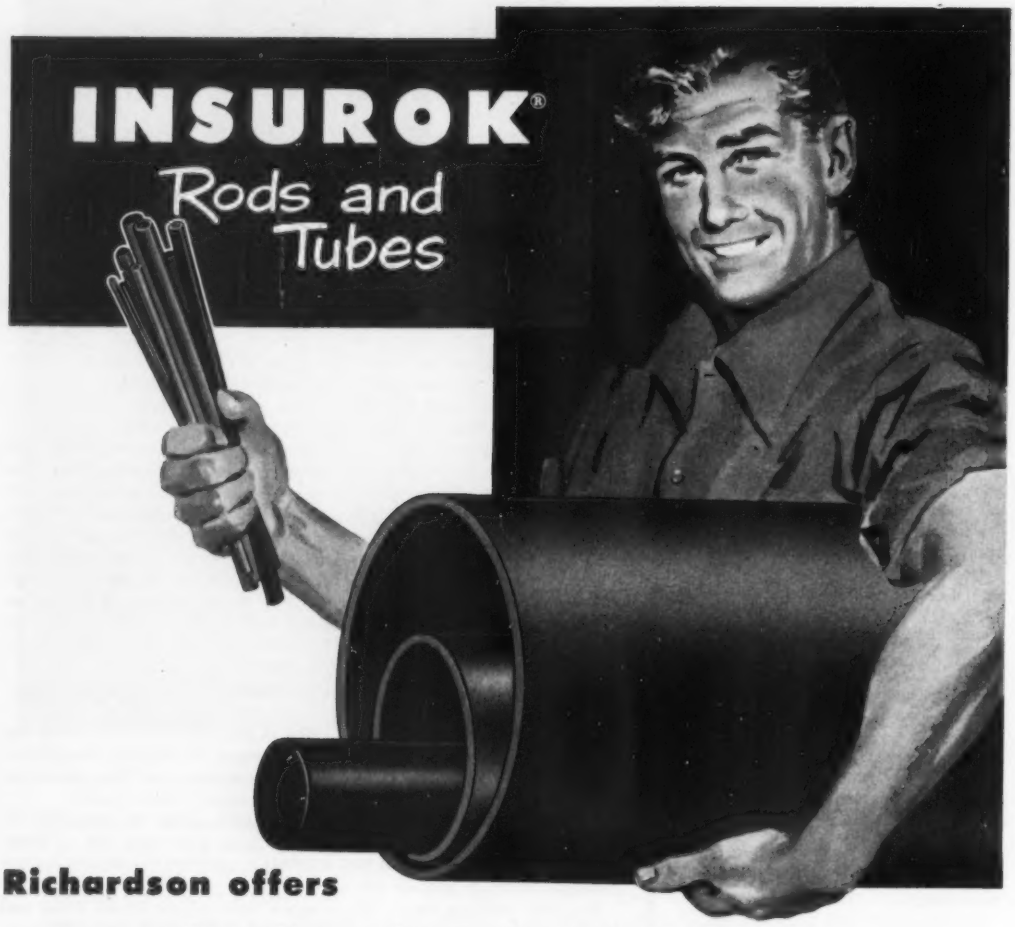
We need thinking about telephone poles and billboards and a hundred and one other outdoor products. We need new thinking in the automotive field, the refrigeration field, and the other home appliance fields. We need new thinking about the big "Do It Yourself" market whereby the average Saturday afternoon mechanic can use plastics to improve his own standard of living.

We need new thinking on the vast potentials of industrial resins—on the use of resins in concrete, in building blocks, in adhesives, in coatings, and even, perhaps, on our highways.

In 1953, by virtue of an increasing population and an expanding economy and by virtue also of good engineering and marketing, we shall certainly expand the use of plastics in all presently accepted fields. But in 1953, we will be failing to meet the challenge and missing marvelous opportunities if we don't pioneer fundamental new fields of use.

In 1953 we must broaden our bases of plastics application.

INSUROK®
Rods and Tubes



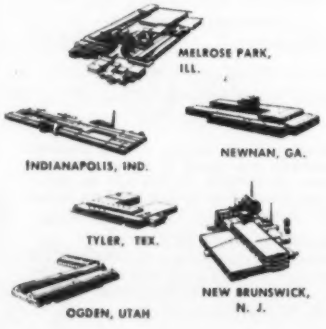
Richardson offers

a complete line of Laminated Plastic

Rods and Tubes to meet your needs

You'll find a large range of laminated plastic rods and tubes of various diameters in the Richardson line. Laminated tubes are available in fabric-base and paper-base grades, in 36" lengths and in diameters from ⅛" to 12½". Special larger sizes can be made upon request. Laminated rods are available in molded-paper or fabric-base grades in diameters from ⅛" to 2". Diameters from 2" to 6" can be machined from sheet stock.

Whatever your plastics requirements, consult The Richardson Company. Richardson offers a *complete* plastics service—embracing materials development, design, molding, laminating, and fabricating. Write for 20-page booklet—"Laminated INSUROK."

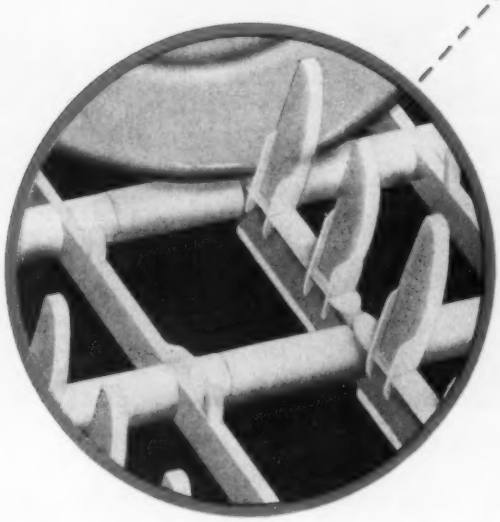


The RICHARDSON COMPANY

FOUNDED 1858 — LOCKLAND, OHIO

2789 Lake Street, Melrose Park, Illinois (Chicago District)

Dishwasher conveyor molded of Du Pont nylon plastic



Parts molded by
Hauser Products, Inc., Chicago
for G. S. Blakeslee & Co., Chicago

DU PONT

Better Things for Better Living
. . . through Chemistry

Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

withstands caustic detergents and scalding water...won't chip or scratch china and glassware

A manufacturer of dishwashing machines decided to apply the assembly-line technique of mass production to washing dishes. His engineers designed a machine with a conveyor that carried the dishes under a hood where they are sprayed first with fresh water to wash off loose food, then with a detergent solution to dissolve grease, rinsed, sterilized with scalding water and air-dried. The problem was finding a material for the dish conveyor that would stand up under these conditions, yet not chip or scratch the dishes.

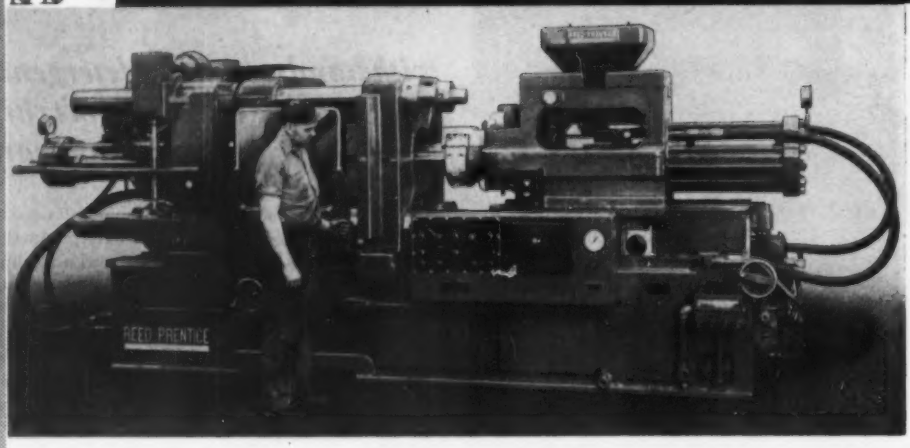
The answer proved to be injection-molded parts of Du Pont nylon that fit on brass tie rods so that no metal touches the dishes. The parts link together to form a continuous belt of "fingers" that support the dishes.

Every step of the way Du Pont nylon is excellent for the job. Because nylon is resilient, it will not scratch or chip china and glassware. Yet nylon is tough and virtually unbreakable in normal use. It withstands food acids, caustic detergent solutions and temperatures up to 250°F. The conveyor tie rods are fitted with molded nylon rollers which are adequately lubricated by water or detergent solutions—either of which would make the use of conventional lubricants almost impossible.

Perhaps the many valuable properties of Du Pont nylon plastic can help you improve or develop a product. For further information on nylon and other Du Pont plastics, write:

E. I. du Pont de Nemours & Co. (Inc.),
Polychemicals Department; District Offices:
350 Fifth Avenue, New York 1, N. Y.
7 S. Dearborn Street, Chicago 3, Ill.
845 E. 60th Street, Los Angeles 1, Calif.

LOOK TO THE NEW 20 oz. "REED" for more Profits in Plastics



Here's a new profit-maker for injection molders—the 400T-20 oz. "REED".

This 20 oz. injection press combines higher plasticizing capacity with the exclusive construction and operating features that have made Reed-Prentice synonomous with record production in the plastics field.

For the full facts on the new 20 oz. "REED", write for Bulletin #400.

The 400T model is also available in 24 oz. capacity at reduced pressure

SPECIFICATIONS	20 oz.
Die locking pressure, tons	400
Rated casting area, sq. in.	200
Mold opens	16"
Maximum die space	24"
Size of die plates	45 x 40"
Weight, lbs.	31,000

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

REPRESENTATIVES:
Houston .... Preston Machine Tool Sales Co.
Seattle & Spokane ..... Star Machinery Co.
Minneapolis ..... Chas. W. Stone Co.
Los Angeles .... Western Molders Supply Co.

INJECTION MACHINES
REED-PRENTICE CORP.
WORCESTER MASS., U.S.A.

MAIN OFFICE
677 Cambridge St., Worcester 4, Mass.
BRANCH OFFICES
75 West St., New York 6, N. Y.
1213 West 3rd St., Cleveland 13, Ohio
4001 N. Elston Ave., Chicago 18, Illinois
2842 W. Grand Blvd., Detroit 2, Michigan

Your product needs help in today's "*Help Yourself*" market

GIVE IT GLAMOROUS VISIBILITY IN CELANESE* *Acetate*

Transparent packaging can give your product the selling edge it needs in today's "help yourself" market. Sparkling clear containers demand attention . . . give your product a chance to sell itself . . . add a lifting look of glamor that makes sales easier, faster.

More and more merchandisers are using low-cost acetate containers to push their products. Acetate sells dime store items as well as luxuries . . . upgrades staples . . . multiplies combination sales of companion items.

You can buy Celanese acetate transparent containers in a wide variety of *stock* sizes and shapes. For names of container manufacturers and suppliers, write Celanese Corporation of America, Transparent Films Dept. 101-A, 180 Madison Avenue, New York 16, N. Y. In Canada, Canadian Chemical & Cellulose Company, Ltd., Montreal and Toronto.

Celanese* **Acetate** TRANSPARENT FILMS

*Reg. U. S. Pat. Off.

Chemicals you live by

your product has more to offer with

DIAMOND PRECIPITATED $CaCO_3$

There is a DIAMOND Precipitated Calcium Carbonate to meet almost every requirement of the rubber compounder. All are chemically precipitated under accurately controlled conditions to produce the highest degree of uniformity and purity. Your nearest DIAMOND Sales Office can help in selecting the type and grade most suited to your requirements.

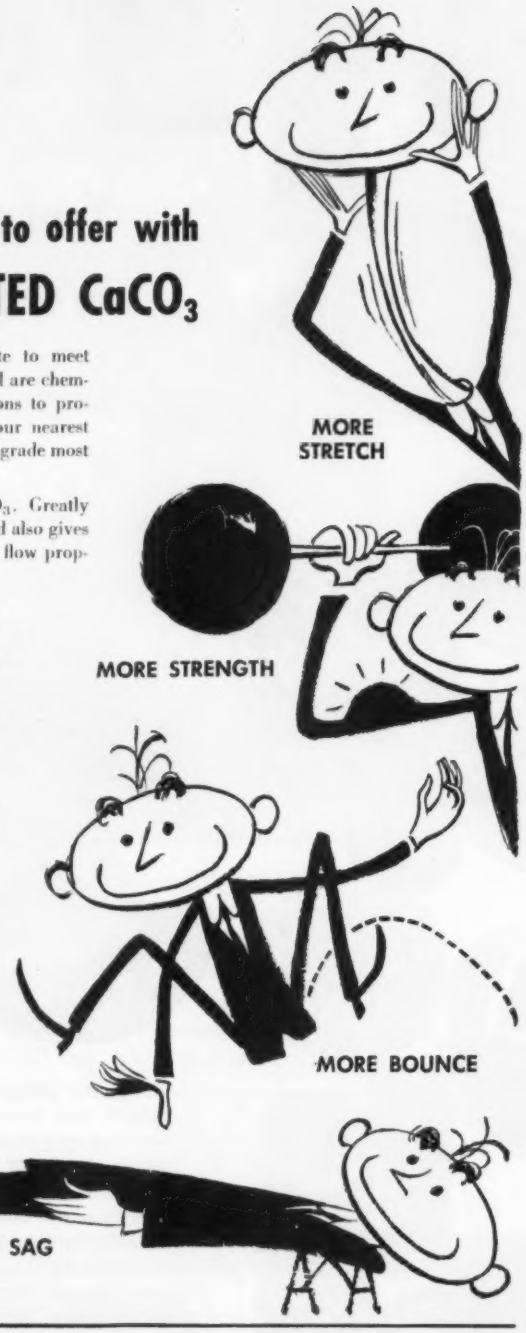
SUPER MULTIFEX®—ultra-fine particle, coated $CaCO_3$. Greatly increases tear resistance of natural rubber and GR-S and also gives good tensile strength and low modulus. Gives excellent flow properties to molded compounds.

MULTIFEX MM®—uncoated precipitated $CaCO_3$. Particle size slightly larger than SUPER MULTIFEX and therefore has slightly lower reinforcing effect. Requires less power to incorporate.

KALITE®—a semi-reinforcing coated filler which, at proper loading, will increase tear and tensile properties. Imparts specific processing advantages to calendered and extruded compounds. Provides smooth surface, reduced shrinkage, higher tube speeds with low heat generation. Recommended for highly loaded soft rubber compounds.

MILLICAL®—due to fine particle size, this uncoated precipitated calcium carbonate exerts a stiffening effect on green or uncured compounds. Prevents sagging or collapsing when cured in open steam. Recommended as primary filler in rubber floor tile.

NON-FER-AL®—an economical non-reinforcing filler for use in highly loaded compounds where low modulus is desired. Very pure. Non-abrasive.



DIAMOND SALES OFFICES:
New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

DIAMOND DISTRIBUTORS:
C. L. Duncan Co., San Francisco and Los Angeles; Van Waters and Rogers, Inc., Seattle and Portland, U.S.A.; Harrisons & Crosfield (Canada) Ltd.

DIAMOND ALKALI CHEMICALS®

DIAMOND CHEMICALS FOR THE RUBBER INDUSTRY

DIAMOND ALKALI COMPANY...CLEVELAND 14, OHIO

Ideal Plastics offers the complete service you want from your custom molder

As wonderful as modern injection molding is, a large proportion of molded plastic pieces require fabricating and finishing to ready them for use. It is only natural, therefore, that Ideal Plastics is equipped with extensive finishing facilities, closely co-ordinated with our vast custom injection molding capacity.

MOLDING AS MOLDING SHOULD BE — COMPLETE IN EVERY PHASE

The four molded styrene pieces which make up this attractive display would have no significance if Ideal's Finishing Department didn't tie them together. Before being securely glued, the pieces are decorated by a combination of roller painting, spray painting, and hot stamping. Then a chain is added for wall mounting, and an adhesive sponge pad is attached to the base for mounting on a counter or cash register top.

Ideal

Ideal does the entire job

Under one roof Ideal handles every phase of your custom molding assignment from product design through packing the carefully inspected pieces for shipment. When necessary we make and test full-size models of your product. Then we engineer and machine the molds in our own toolrooms, mold the pieces of the proper material on the most efficient molding machines available, and turn them over to our fabricating and finishing departments.

Fabricating and finishing facilities

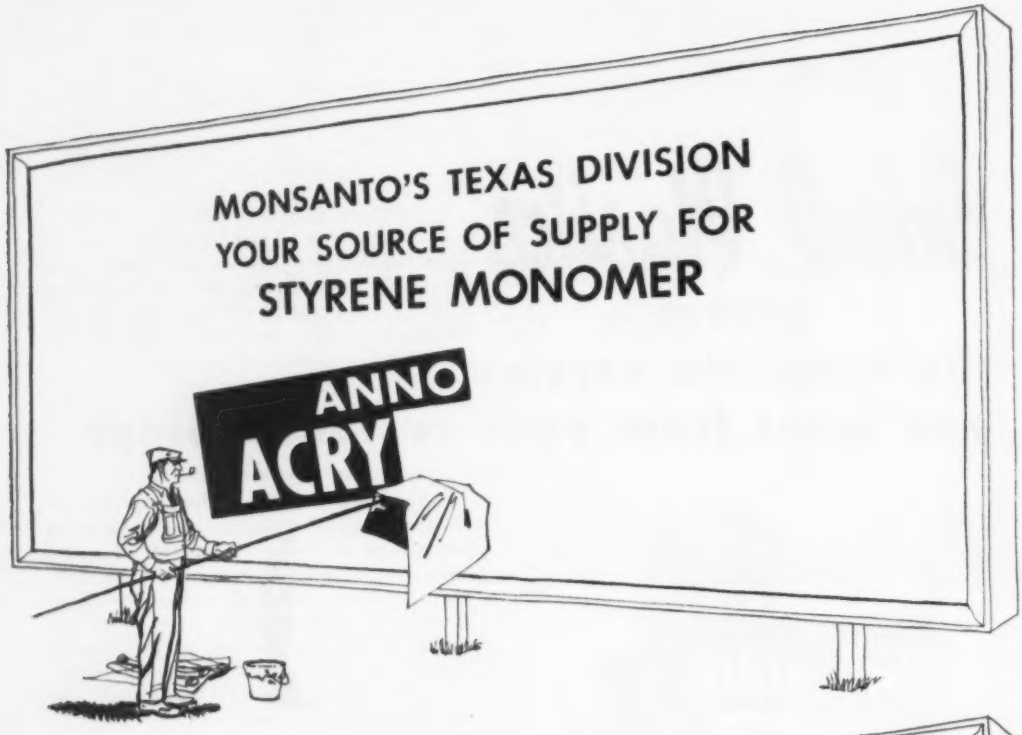
To as great an extent as possible Ideal's Finishing Department is conveyorized and mechanized. At large assembly tables, deft operators use enormous amounts of gluing and clamping equipment. An electroforming section makes the precision masks used in accurately spraying on eye-catching decorations. A group of hot stamping presses apply colors at high speed. Numerous sanding machines, buffing wheels, arbor presses, drill presses, and electronic sewing machines are skillfully used for other fabricating tasks.

The department is located adjacent to conveyor-fed inspection and packing tables. Sealed cartons of completed products are wheeled into Ideal's trucks which speed them to you, the customer, without delay.

Seeing Ideal is a "must"

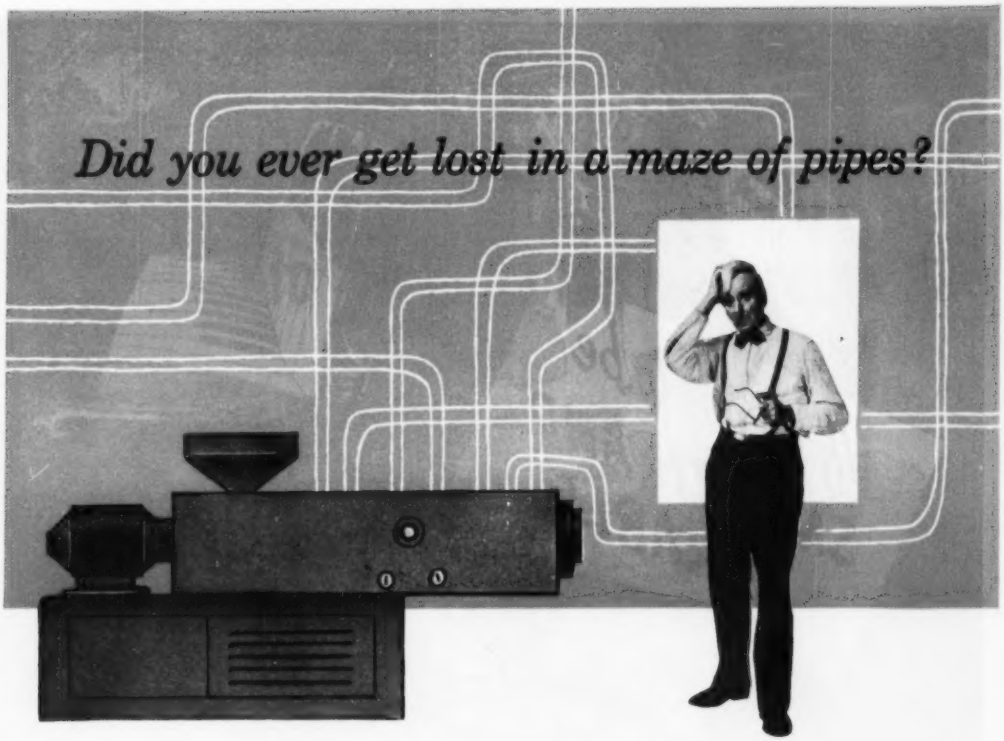
No order for custom molded plastics is complete unless Ideal has had an opportunity to show you what this great organization—devoted entirely to injection molding—can do. Address your inquiry to A. C. Manovill, Vice Pres. in Charge of Sales, IDEAL PLASTICS CORPORATION, 184-10 Jamaica Ave., Hollis 7, N. Y. Phone: AXtel 7-7000. Mid-west Representative, Steel Mill Products Co., 176 West Adams St., Chicago 3, Ill. Phone CEntral 6-5136.

Better Molded Plastics for Industry & Home



Now you can save time . . . get faster deliveries . . . simplify ordering procedures . . . make production planning easier . . . by ordering these two basic chemicals from *one* source. For details write to Monsanto Chemical Company, Texas Division, Texas City, Texas.

MONSANTO
CHEMICALS—PLASTICS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

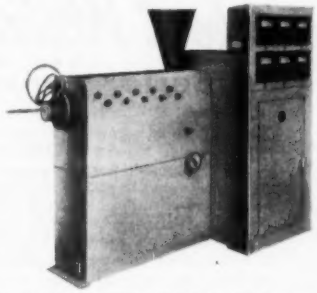


The man above is suffering from a slightly exaggerated case of "Let's hook-another-pipe-to-our-extruder." When the need arises for more heat or for less heat at any particular spot, it is comforting to have an extruder that has *all* the temperature regulating contraptions *built right in.*

Regardless of the material or the cross section being extruded, MPM extruders never require patched-on insulation or makeshift plumbing to bring the compound up or down to the desired plasticity. Every necessary thermal control device is where it belongs—beneath the cowlings that give MPM extruders the finished look a piece of precision apparatus should have.

Frictional heat can be balanced against the heat input of MPM's efficient electrical heating system, by means of the 9 to 15 radially jacketed cooling zones each MPM extruder has. This permits the operator more readily to control the compound temperature so it reaches the die ready for extrusion. Excessive frictional heat is immediately indicated on the control panel and a simple valve adjustment compensates. Cored screws provide additional heating or cooling as required.

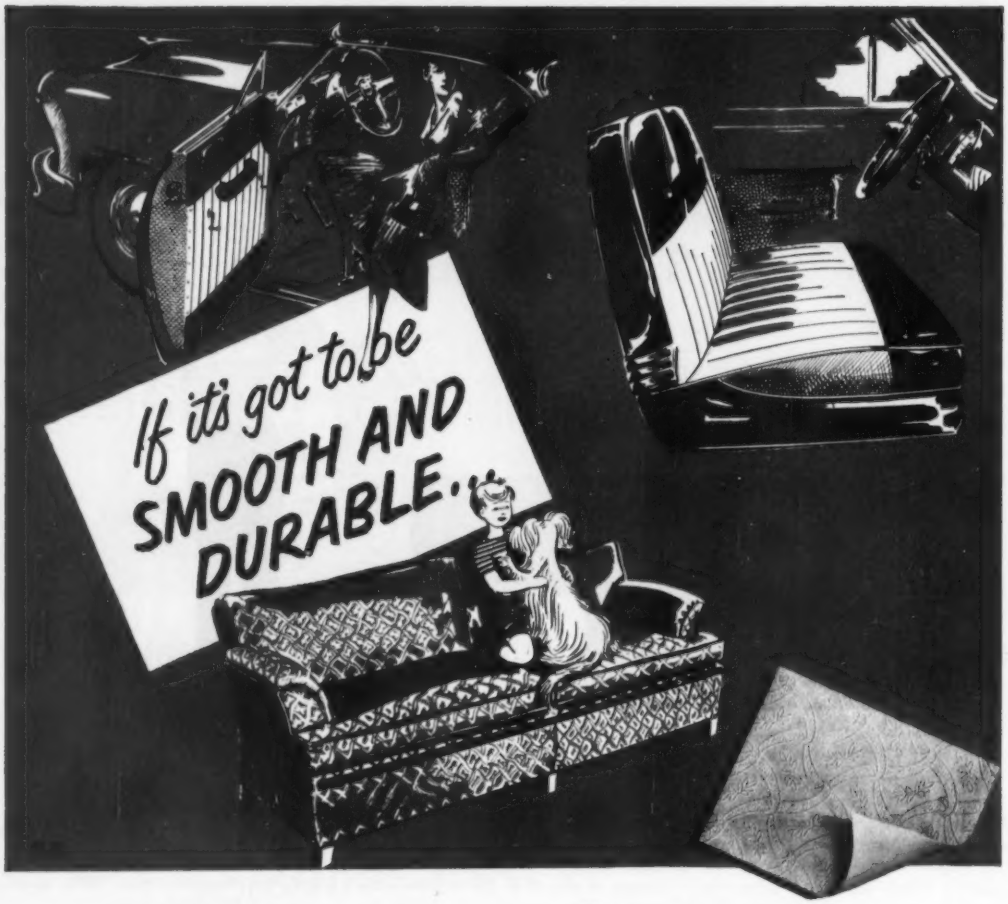
Every part of each MPM extruder is designed and constructed for long-time trouble-free service—solid corrosion resistant interior parts, built-in speed indicator, simplified installation, ample vari-speed drives. The new materials which are being developed almost every day *demand* an extruder with the flexibility that MPM gives you. Ask for details today.



The MPM 2½" extruder is widely used to produce blown film, covered wire, piping and solid cross-sections.

modern plastic machinery corp.

15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX



make it Wellington Sears "Lantuck"

a superior non-woven fabric for coating

Offering balanced strength in all directions due to its completely random distribution of fibers, Lantuck, Wellington Sears non-woven fabric, also provides smooth surface and high gauge-weight ratio at reasonable cost. It assures improved stitch and tear strength without interfering with the vinyl film's soft, pliable hand, so important in upholstery applications. The random fibers are bonded with a resin especially selected for use with vinyl coatings to give maximum strength and flexibility.

Lantuck is now made in 54 and 56 inch widths for coating and in weights of about three to four ounces per square yard.

Other Wellington Sears fabrics for coating and laminating are listed at right and are available in standard and special constructions from the "headquarters for industrial fabrics."

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Dept. J-5, 65 Worth Street, New York 13, New York.

Superior Fabrics for Coating and Laminating

Single filling ducks
Army ducks
Single and plied-yarn chafers
Special ducks
Sateens
Twills
Broken twills
Drills
Sheetings
Nylon, rayon and other synthetics
Lantuck non-woven fabrics

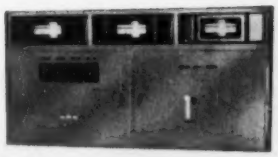
Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

OFFICES IN: ATLANTA • BOSTON • CHICAGO • DETROIT • LOS ANGELES • NEW ORLEANS • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS



Three-zone temperature control

the W-S 16 OUNCE HORIZONTAL MOLDING MACHINE

Experience has shown that the day-to-day shirt-sleeve jobs are done most economically on the intermediate size machines—notably the famous W-S 16 ounce Injection Molder.

There's more than size, however, behind the outstanding preference for this model. Consider, for example, a single machine in which *all* these features are offered:

- Extra long heating cylinder for increased plasticizing efficiency . . . COMPARE!
- Three-zone temperature control . . . COMPARE!
- Replaceable bronze bushings in cylinder and moving platens...COMPARE!
- Faster cycles with dual pressure controls . . . COMPARE!
- Hydraulic and electric safety controls . . . COMPARE!
- Special pumping unit . . . COMPARE!
- Remote control panel . . . COMPARE!

If *your* profits are coming in something less than the full measure, it will pay you handsomely to investigate this profit-booster NOW. Detailed literature and/or personal analysis without obligation.

W-S HYDRAULIC

THE WATSON-STILLMAN COMPANY

DIVISION OF H. K. PORTER COMPANY, INC.

150 Aldene Rd., Roselle, New Jersey

Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Avenue, New York 16, N. Y.

Correspondents Throughout the World

NO. ½ T. D.
MATERIAL GRANULATOR

CAPACITY: 500 lbs. an hour based on Polystyrene scrap with 5/16" screen.

HORSEPOWER: 7½

THROAT OPENING:
Regular—5½" x 20"
Model 451—8" x 20"

FLOOR SPACE: 3'8" x 3'11"

WEIGHT: 1100 lbs.

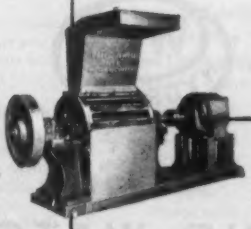
SPECIAL DESIGN ADVANTAGES

- Small floor space required but high capacity
- Available with large throat for material that is difficult to feed
- Convenient material collecting bin
- Easily accessible for cleaning

Your grinder source for every individual plastic material cutting requirement and capacity (50 to 3,000 lbs. per hr.)—Ball & Jewell, machine tool builders since 1865, have always paced the grinding needs of the plastics industry. Send us your requirement specifications.

Require A Smaller Machine?
B & J STANDARD IDEAL
Throat opening: 3½" x 10" or 6" x 10"
Horsepower: 2
Capacity: 250 lbs. an hour

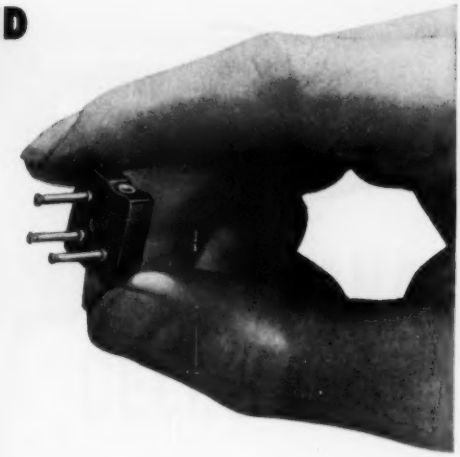
Require A Larger Machine?
B & J No. 1 CUTTER
Throat opening: 7" x 24"
Horsepower: 10
Capacity: 750 lbs. an hour



BALL & JEWELL, INC. *Leadership Through Continuous Engineering Improvements*

22 FRANKLIN STREET, BROOKLYN 22, NEW YORK

ASK FEDERAL TELEPHONE AND RADIO ABOUT KURZ-KASCH MOULDED PLASTICS!



ASK ABOUT THE PROBLEM! This moulded plastic spool assembly consists of two parts—both intricate and delicate challenges to the moulder. The front part is moulded with a threaded brass insert, an iron core, an extended contact point plus four moulded .093" dia. bosses. Rear assembly has as integral parts a threaded brass insert, three minute pin type terminals, plus four .046" dia. through cored holes and one cored hole for mounting. They're shown here actual size.

ASK ABOUT K-K MOULD-MAKING SERVICE! These parts were needed fast. The numerous inserts moulded in at all angles necessitated complete cavities disassembled on the bench for ejection. Yet our first 4-cavity transfer mould with 2 sets of impressions was ready for production *ahead* of a very tight schedule.

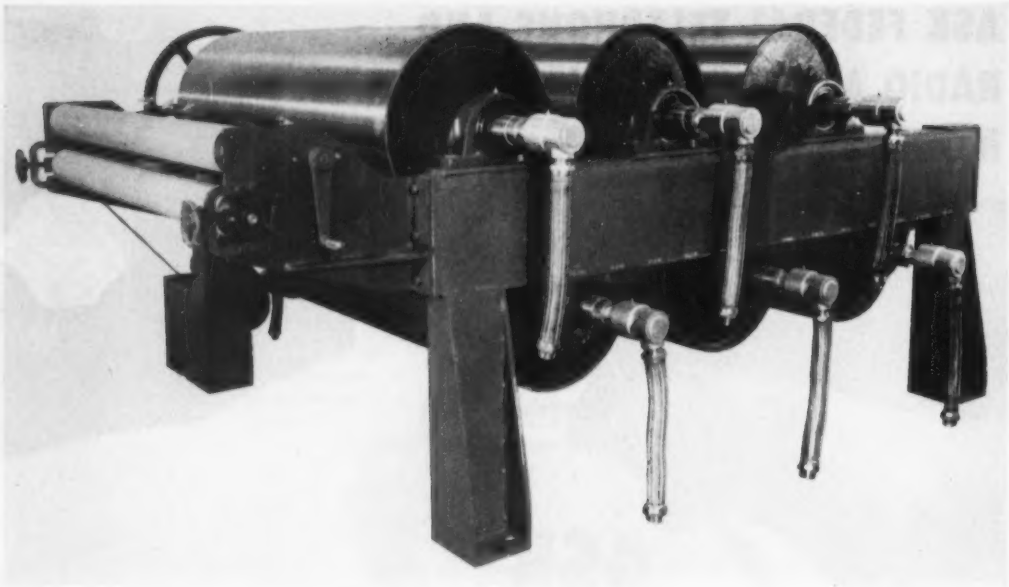
ASK ABOUT K-K MOULDING PRODUCTION! Shipments are required in quantity—and on specified schedules, of course. And that's just the type of service that we specialize in delivering!

THEN ASK YOURSELF . . . ***"If Kurz-Kasch can keep on satisfying leading manufacturers like Federal Telephone and Radio Corporation—and as long as it has had a record like that for over 36 years—why don't we try Kurz-Kasch ourselves?"*** **WHY NOT? We solicit your inquiry.**

Kurz-Kasch, Inc. • 1415 S. Broadway • Dayton 1, Ohio

BRANCH SALES OFFICES: New York, *Lexington 2-6677* • Rochester, *Hillside 4352* • Chicago, *Merrimac 7-1830* • Detroit, *Trinity 3-7050* • Philadelphia, *Hilltop 6-6472* • Dallas, *Logan 1970* • Los Angeles, *Richmond 7-5384* • St. Louis, *Delmar 9577* • Toronto, *Riverdale 3511*
EXPORT OFFICE: 89 Broad Street, New York City, *Bowling Green 9-7751.*

Kurz-Kasch
FOR OVER 36 YEARS PLANNERS AND MOULDERS IN PLASTICS



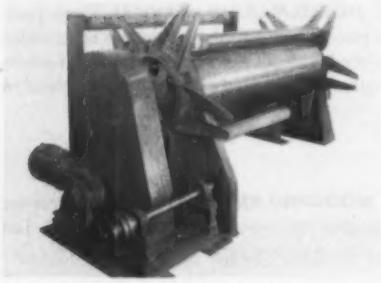
COOLING TRAINS BY DILTS

Dilts cooling trains for plastic film and sheeting feature:

- Double wall drums for efficient cooling
- Drum surfaces of stainless steel
- Gears of Helical type
- Razor or scoretype slitting attachments

These cooling drums are available in standard sections of three, six, nine—as the need dictates—or can be supplied singly.

Dilts engineers and builds complete take-off equipment from calender to windups, including "Ferristart" winder, also here shown.



Dilts "Ferristart" plastic winder

DILTS MACHINE WORKS

Fulton, New York

SHARTLE BROS. MACHINE CO., Middletown, Ohio
Divisions of THE BLACK-CLAWSON CO., Hamilton, Ohio
Subsidiary: B-C INTERNATIONAL LTD., London, S. W. 1, England
Northern Sales Office: 814 N. Superior St., Appleton, Wisc.
Southern Sales Office: 685 W. Peachtree St. N. E., Atlanta 3, Ga.
Western Sales Office: Mayer Building, Portland, Oregon
Associate: THE ALEXANDER FLECK LIMITED, Ottawa, Ontario

Dilts

Calendered film or sheeting with Dilts take-off including cooling drums & surface winder.

COMPLETE PLASTIC TAKE-OFFS

SOCIETA ITALIANA DELLA CELLULOIDE

CELLULOID	sheets, rods, tubes, ribbon
SICALOID	cellulose acetate sheets, rods, tubes, ribbon
SICOFOIL	cellulose acetate and nitrate film
SICALIT	cellulose acetate moulding powder
SICOSTIROL	polystyrene moulding powder
SICOVINIL	rigid vinyl sheets
SICALENE	polyethylene tubes and sheets for packaging
NITROCELLULOSE	for industrial purposes

Works & offices: CASTIGLIONE OLONA
VARESE, Italy

World Wide Plastics

Tower Bridge, London

From the Port of London, and the other great sea ports of Britain, I.C.I. Plastics Division despatches to every quarter of the globe the widest range of plastics in the world produced by a single manufacturer.

This great export potential is supported by a world wide network of subsidiary and associated companies and independent agents through whom technical service facilities are freely available to all customers.

World Wide Service

IMPERIAL CHEMICAL INDUSTRIES LIMITED

Plastics Division, Black Fan Road, Welwyn Garden City, Herts, England

---

U.S.A enquiries to :—

Arnold, Hoffman & Co. Inc., *521 Fifth Avenue, New York 17, N.Y.*

New

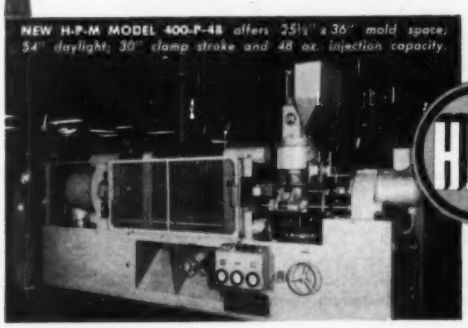
H-P-M's 48 oz. PRE-PLASTICIZER

- Deeper Draws
- Strain-free Parts
- Better Dry-Coloring
- Faster Cycles
- Lighter Weight Parts
- Less Part Distortion

"We are now operating 4 H-P-M Pre-plasticizing Machines, including the new 48 oz., and have another "48" on order. On machines larger than 12 oz., preplasticizing is a must for our business. We wouldn't buy anything else."

This 11" deep combination waste basket and garbage pail, molded in impact styrene, tells the story of H-P-M's new 48 oz. injection machine. No longer are giant machines required to make deep section parts. Here's a high-speed, medium size machine that will do the job for many thousands of dollars less and is versatile enough to handle smaller "shots", too. It's a pre-plasticizer . . . not a conversion unit . . . and gives the injection molder all the cost-saving advantages of pre-plasticizing . . . no chance of burning material . . . flat parts without distortion . . . more parts per hour . . . less weight per part . . . truer color blending . . . better finish . . . easier mold release.

Yes, there's a multitude of reasons why you should investigate H-P-M's new 48 oz. pre-plasticizer. Write today for details!



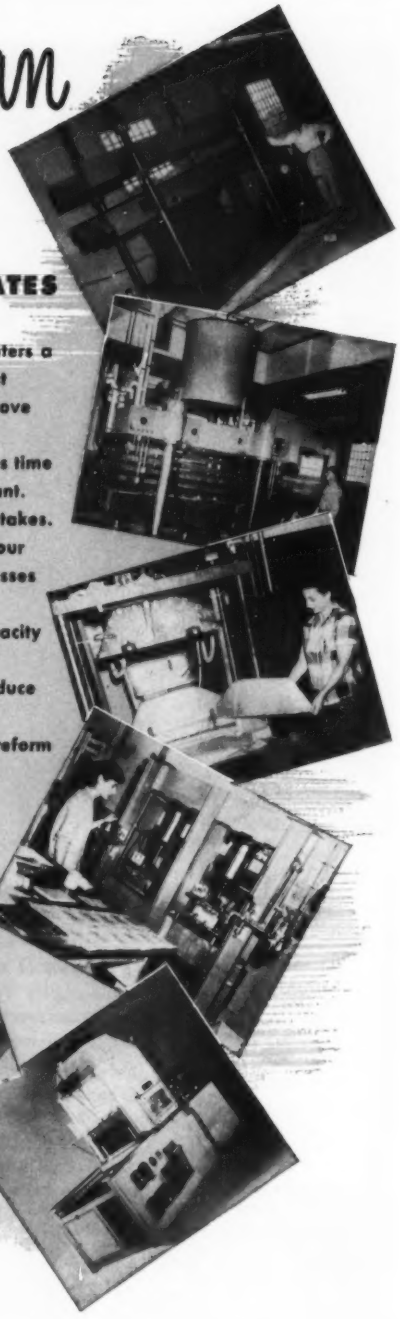
NEW H-P-M MODEL 400-P-48 *offers 25½" x 36" mold space, 54" daylight, 30" clamp stroke and 48 oz. injection capacity.*

HPM

THE HYDRAULIC PRESS MFG. CO.

It takes more than PRESSES

TO MAKE GOOD REINFORCED LAMINATES



And we have what it takes. At Russell, before a new part enters a press, you can be sure that it has been carefully diagnosed . . . that skilled chemists and engineers have worked in harmony to approve the base material, the resins, the technique and the timing.

It's the study we give to a part before production that saves us time later, saves you money and makes rejects virtually unknown in our plant.

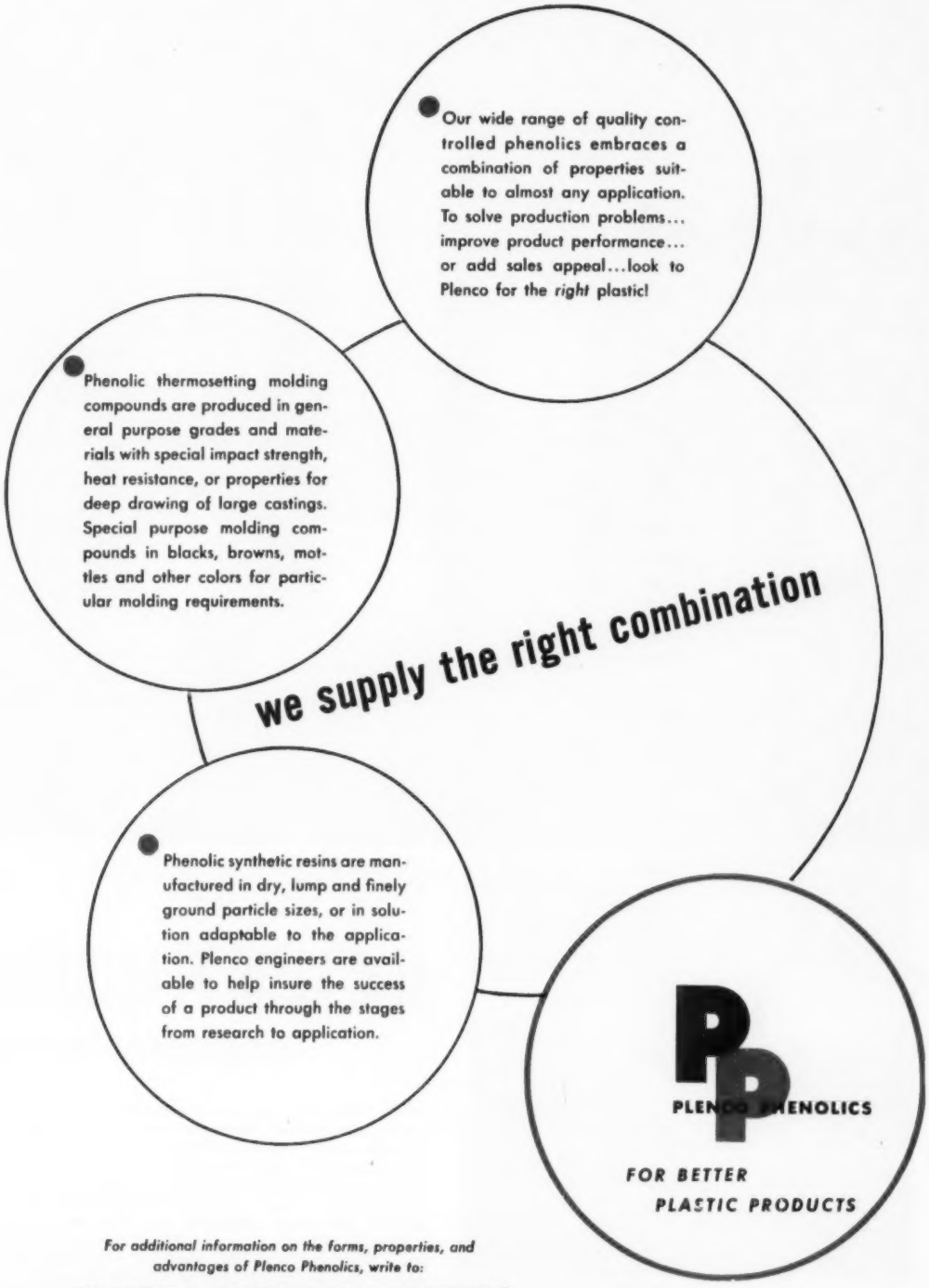
Only then are presses important. And again, we have what it takes. Except for our battery of small presses, the largest in America, all our equipment is widely diversified . . . not ordinary all-purpose presses but ones designed by us specifically for reinforced laminates . . . unique in the industry. These range from presses with a capacity of 80 tons pressure to more than 1,200 tons . . . from those with 24" of daylight to others of 66" and 75". . . from machines that produce one complex part to one that will turn out fifteen 4' x 9' flat sheets at a time . . . or a press that will make a part 13' long. Our 48" Preform is an important adjunct in preparing parts for our larger presses. When you need "what it takes" to solve your problem in reinforced plastics, save time by consulting Russell first.

Write for illustrated brochure

by Russell

Associated Companies

REINFORCED PLASTICS CORP., West Hoffman Avenue, Lindenhurst, L.I., N.Y.
STRUX CORPORATION • Lindenhurst, L.I., N.Y.
AIRCRAFT SPECIALTIES CO., INC. • Hicksville, L.I., N.Y.
REGAL PLASTIC COMPANY • Kansas City 6, Missouri
GLADWIN PLASTICS, INC. • Atlanta 3, Georgia
ALLIED PRODUCTS ENGINEERING CO. • Los Angeles 43, Cal.
WESTERN FIBERGLAS SUPPLY CO. • Los Angeles, San Francisco, Seattle


Our wide range of quality controlled phenolics embraces a combination of properties suitable to almost any application. To solve production problems... improve product performance... or add sales appeal...look to Plenco for the *right* plastic!
Phenolic thermosetting molding compounds are produced in general purpose grades and materials with special impact strength, heat resistance, or properties for deep drawing of large castings. Special purpose molding compounds in blacks, browns, mottles and other colors for particular molding requirements.
we supply the right combination
Phenolic synthetic resins are manufactured in dry, lump and finely ground particle sizes, or in solution adaptable to the application. Plenco engineers are available to help insure the success of a product through the stages from research to application.
PLENCO PHENOLICS
FOR BETTER PLASTIC PRODUCTS

For additional information on the forms, properties, and advantages of Plenco Phenolics, write to:

PLASTICS ENGINEERING COMPANY
Sheboygan, Wisconsin

THE COMPANY'S new plasticizer plant includes a modern processing unit and this large tank farm for raw materials and finished plasticizers.

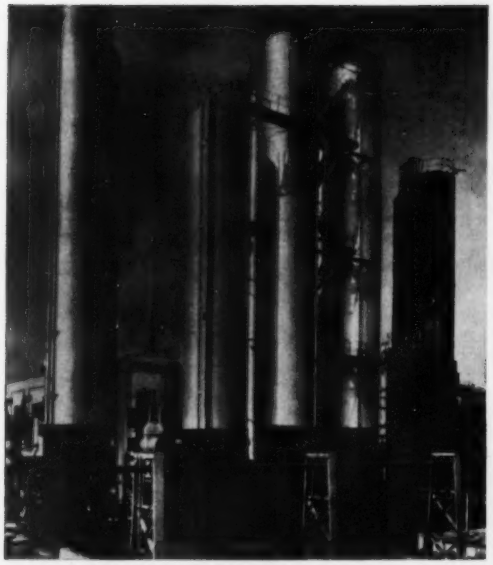
1 **SOURCE** of basic coal chemicals for PX Plasticizers is this battery of 140 coke ovens. Fed from large coal stock piles in foreground, they operate around the clock.

NEW BASIC PLASTICIZER

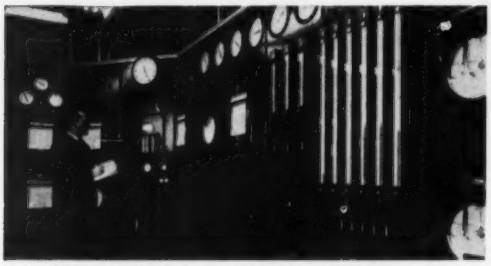
Controls quality from coal

ONE million pounds per month have been added to the nation's plasticizer production capacity with the completion of Pittsburgh Coke & Chemical Company's new plasticizer plant this month. Erected at Neville Island, near Pittsburgh, Pa., the new plant is located in the heart of one of our most plentiful sources of coal and other important raw materials.

Pittsburgh's new plant is completely integrated with the company's basic coal chemical production facilities at Neville Island. Molten phthalic anhydride, for example, is piped directly to the plasticizer plant from Pittsburgh's adjoining phthalic plant. As a result of this unique basic and integrated position, the new



2 **BASIC** coal chemicals used in making PX Plasticizers are recovered from coke ovens in modern chemical equipment like this at Pittsburgh's integrated plant.



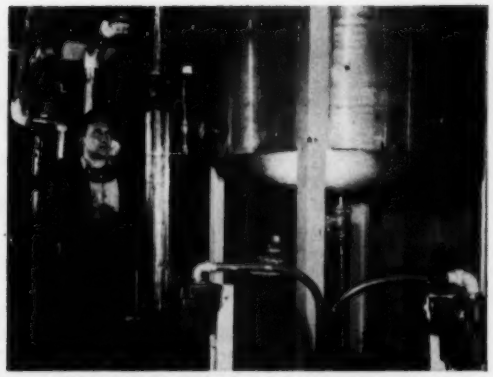
3 **HIGH QUALITY** of phthalic anhydride, important plasticizer intermediate, is rigidly maintained. Pittsburgh's molten phthalic is piped directly to plasticizer plant.

PLANT IN PRODUCTION

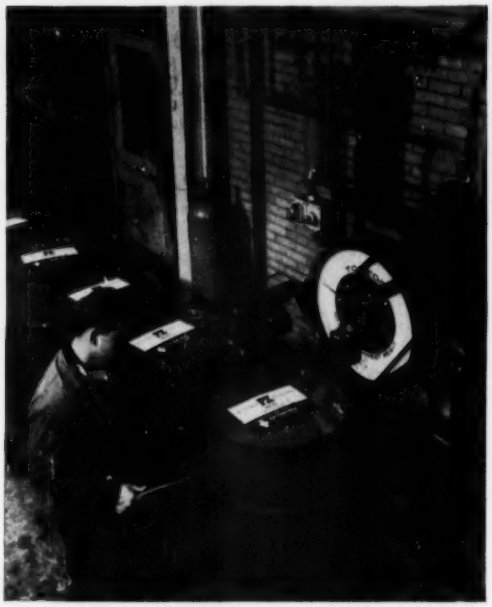
to finished product

plant can produce clear, water-white plasticizers that are quality controlled from coal to finished product.

Customers of Pittsburgh Coke & Chemical are assured of two other important benefits because of the company's ability to control every phase of plasticizer production: (1) Plasticizers of consistent peak quality, regardless of whether shipments are made by the pound or by the tank carload. (2) Prompt deliveries and continuing supplies, regardless of varying market conditions affecting material supplies.



4 **PROCESSING TANKS** like a large part of the new plant's equipment, are made of stainless steel to help protect the quality and purity of finished plasticizers.



5 **DRUMMING OFF** Pittsburgh PX Plasticizers is accomplished on special filling scales. When correct weight is attained, flow of plasticizer is automatically stopped.

WBD4424

PLASTICIZER DIVISION

PITTSBURGH
COKE & CHEMICAL CO.

Grant Building · Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Fiore electroformed metal masks and spraying equipment

Precision-fit Fiore masks often spell the difference between a low cost, first rate paint job and sloppy decorating that costs far more than it ought to. Fiore masks assure sharply defined edges and close registration of colors. They are *engineered* by *specialists* who have designed and built all types of masks for some of the country's leading, most particular molders.

SPRAYING EQUIPMENT—Quality in spray painting plastics depends on having jigs, fixtures, spray guns and booths which allow you to use your masks with maximum efficiency and speed. Fiore spray equipment is engineered to the same high quality as Fiore masks.

Write today for additional details. Include samples or drawings for estimates on electroformed masks that will insure precision spraying.

Typical products decorated with Fiore electroformed masks and spraying equipment.

WM. M. FIORE INC.

135 Liberty Street New York 6, New York

BArclay 7-2569

Cut your scrap loss with Pliovic

Re-runs of trim like this are easy with PLIOVIC G90V

You will find—as many vinyl processors have already discovered—that you get less scrap, more re-usable trim, tailings and ends when you turn to PLIOVIC G90V—Goodyear's new polyvinyl chloride resin.

That's because PLIOVIC G90V has outstanding heat stability—giving less degradation and loss of physical properties when reworked. It also permits high calender speeds and fast extrusions that mean more production.

PLIOVIC G90V has a high uniform bulk density for ease in handling—good color for use in clear or pigmented compounds—and can easily be compounded for use in a wide range of products.

First in a series of polyvinyl chloride resins, PLIOVIC G90V is another use-proved product by Goodyear. Write for full details today to:

Goodyear, Chemical Division, Akron 16, Ohio

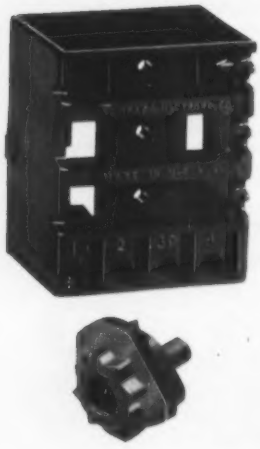
Pliolite, Chemigum, Pliobond, Pliovic—T.M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMICAL GOODYEAR DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Use-Proved Products • CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS • The Finest Chemicals for Industry

New "Diamond H" Hart Heater Switch in Amazing One-Piece Plastic Housing Molded by Bridgeport



The simplest method yet devised for attaching wires to a switch! Connection made by merely pushing stripped end of wire into auto-lock mechanism. This automatic lock releases instantly when lever is depressed. No screws, clips, or gadgets. Another triumph of the well-known knowledge and experience of the Hart Mfg. Co., Hartford, Conn.

An important factor in this wiring achievement is the remarkably intricate, accurate one-piece thermo-setting housing. Another factor is the precisely molded spindle. Further examples of the specialized ability and complete facilities of Bridgeport. This skill can help solve your molding problems, too. Write . . .

BMP BRIDGEPORT MOULDED PRODUCTS, inc.
Box 3276 Barnum Station · Bridgeport, Conn.

Here's the new-design tube that gives

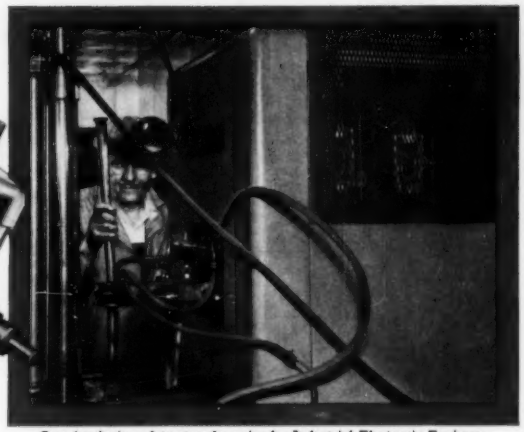
INDUCTION and DIELECTRIC HEATING

"PLUS-ENDURANCE"

For Today's Rugged Production Pace in Metals, Plastics, Wood, Rubber . . .

Federal's F-892

(F-892-R Air-cooled)



Case hardening of tractor shoe pins by Industrial Electronic Engineering Corp., Milwaukee, Wis., using 20 KW Allis-Chalmers induction heating unit equipped with Federal's rugged and reliable F-892 power triode.

First with the new proved-design

DOUBLE HELICAL FILAMENT

- Does away with bowing
- Eliminates filament-to-grid shorts
- Greatly increases tube life

OUTSTANDINGLY DEPENDABLE IN MOMENTARY OVERLOADS

SEALING, soldering, brazing, bonding, molding, annealing, drying, pre-heating . . . *whatever* your electronic heating application . . . Federal's re-designed F-892 power triode really keeps production lines rolling . . . *by reducing time-wasting shut-downs for tube replacements!*

Incorporating Federal's new *Double Helical Filament* (which eliminates filament-to-grid shorts) the F-892 has been especially designed to withstand the hard punishment of sudden and extreme load changes . . . to resist mechanical shock and steady vibration . . . to stay on the job *longer* . . . under the toughest conditions.

Back up *your* induction or dielectric heaters with the ruggedness and *plus*-endurance of Federal's F-892. Its proved-design assures you the highest operating efficiency for 10 and 20 KW equipments . . . with *lower* tube costs through *longer* life and *fewer* replacements!

Write today for full information on Federal's F-892 or F-892-R.

"Federal always has made better tubes"

Federal

Telephone and Radio Corporation

VACUUM TUBE DIVISION — 100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors: International Standard Electric Corp., 67 Broad St., N. Y.

Specify Plastolein Plasticizers...

—for VINYLS

—for CELLULOSICS

—for SYNTHETIC RUBBERS

Emery Monomeric plasticizers are noted for their low temperature properties . . . . . their stability to light and heat . . . . and their outstanding resistance to oxidation and rancidity. Practically water-white . . . they have low pour points, low specific gravities and low volatilities.

The Polymeric types are special polyesters that are designed to supply permanence and durability. Although Polymeric in nature, they are sufficiently fluid at normal temperatures to be handled in bulk with ordinary equipment.

Check these Plastolein Plasticizers for those applicable to your Operation—

PLASTOLEIN 9050 DHZ

(di-2-ethylbutyl azelate)—a highly-efficient specialty plasticizer for high clarity films, coated fabrics, extrusion compounds and other elastomers where low-temperature flexibility is essential. Excellent for non-thickening dispersions.

PLASTOLEIN 9058 DOZ

(di-2-ethylhexyl azelate)—a good all around basic plasticizer that also imparts excellent low temperature properties. Its outstanding combination of properties leads to its use in any vinyl product. Also advantageous for nitrile and GRS rubbers.

PLASTOLEIN 9055 DGP

(diethylene glycol dipelargonate)—a general purpose auxiliary plasticizer for imparting low-temperature flexibility, excellent "hand" and drape to vinyls. Also, an outstanding low-temperature plasticizer for Neoprene and Buna-N rubbers.

PLASTOLEIN 9250 THFO

(tetrahydrofurfuryl oleate)—a fatty type plasticizer of unusual stability, providing internal lubrication for superior processing. Also imparts excellent "hand" and drape to films and sheeting. Its relatively low cost makes it attractive for cellulosics, particularly nitrocellulose, and synthetic rubbers.

PLASTOLEIN 9715, 9720 POLYMERIC

These Polymeric Plasticizers impart extreme durability and weatherability to plastic materials, yet exhibit the low-temperature characteristics and high efficiency of most monomeric plasticizers. They are compatible with the vinyls, cellulosics and synthetic rubbers. Prolonged exposure to heat and ultraviolet light does not result in appreciable discoloration, stiffening, or sweat-out.

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

Be certain your plastics remain plastic

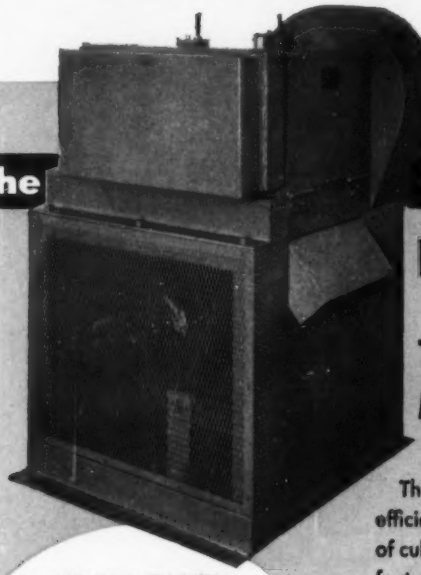
Specify EMERY PLASTOLEIN PLASTICIZERS every time!

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio
EXPORT: 5035 RCA Bldg., New York 20, N.Y.

Branch Offices:
3002 Woolworth Bldg., New York 7, N.Y.
401 N. Broad St., Philadelphia 8, Pa.
187 Perry St., Lowell, Mass.
221 N. LaSalle St., Chicago 1, Ill.
420 Market St., San Francisco 11, Calif.

Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles.

Now Available! A Solution to Your Dicing Problems!



The CUMBERLAND DICING MACHINE

features

THE SIMPLEST, LEAST EXPENSIVE METHOD OF DICING YET DEVISED!

This new Cumberland dicing (or cubing) machine efficiently dices plastic sheet stock into a wide variety of cube sizes. Input speed ranges from 10 feet to 125 feet per minute.

A proven machine, the Cumberland dicer is a modified form of the well-known rotary chopping machine regularly used for many applications throughout the plastics industry. The new dicer has satisfactorily diced *millions* of pounds of plastics!

If you are interested in dicing plastic materials easily and inexpensively, you'll want to investigate the Cumberland dicing machine right away!

WRITE FOR COMPLETE TECHNICAL DETAILS!

USE THIS MACHINE FOR THESE OTHER APPLICATIONS, TOO!

1. Cut heavy vinylite slabs.
2. Cut continuously extruded scrap!
3. Cut side shear from calendering machines.
4. Produce pellets from continuous strands.

For details, request Bulletin 401.

CUMBERLAND MANUFACTURES A COMPLETE LINE OF PLASTICS REDUCING MACHINES

PREBREAKER

Cuts up radio, television cabinets and other large parts. Available with 20" by 32" throat opening (Model 32) and 10" x 24" throat opening (Model 24). Write for details.

GRANULATING MACHINES (All Models)

Seven different models, direct coupled and V-belt driven, are available to meet your requirements. For complete details, request Bulletin 251.

MODEL 18 GRANULATOR

Large capacity double-hung construction for heavy duty applications. Like all Cumberland machines, it is easy to adjust, dismantle, and clean.

CUMBERLAND Engineering Company Inc.

BUILDERS OF BETTER MACHINES FOR THE PLASTICS INDUSTRY

DEPT. 7 · BOX 218 · PROVIDENCE · RHODE ISLAND

California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
4113 West Jefferson Blvd., Los Angeles 16, Cal.

TODAY: *Household brushes that are better looking and longer lasting because of their attractive and durable Hercocel bodies. This clothes brush—one of a complete line molded by Fuller Brush Company with Hercocel A—provides firm anchorage for bristles, withstands hard knocks, and retains its jewel-like luster despite frequent handling. As stated on the package, it "Conforms to the high standards required of all Fuller products."*

DESIGNED TO SELL WITH HERCOCEL®

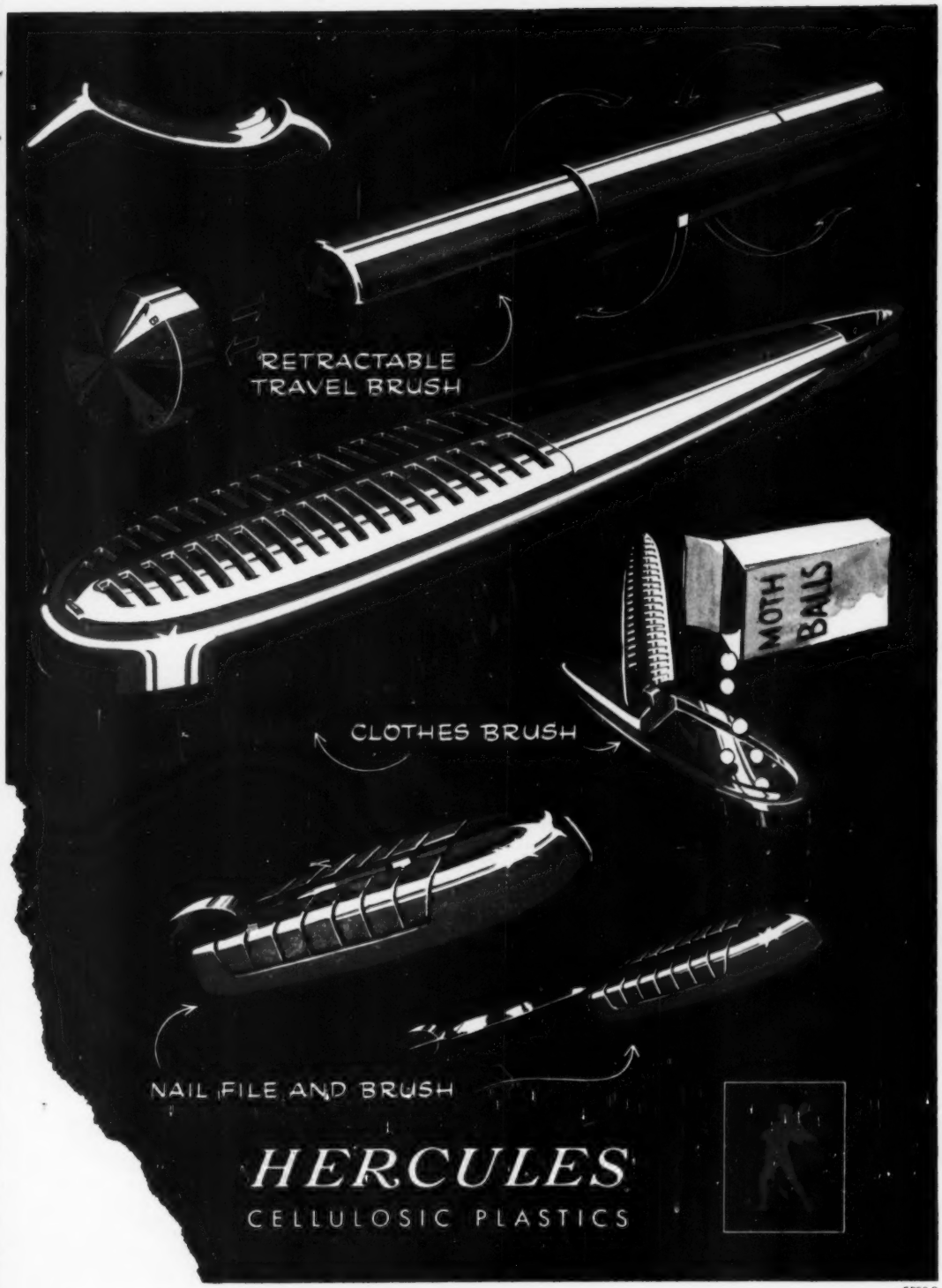
TOMORROW: Many new and novel types of brushes, for home and travel, that employ to full advantage all of the manufacturing and merchandising features of Hercocel plastics. In these sketches, our designer suggests just a few practical ways of using Hercocel's proved qualities to attract new brush sales.

Hercocel is tough, durable, low in cost, and can be quickly and easily molded into designs of practically any size and shape. It is available in a wide range of colors—opaque, translucent, transparent. Remember, too, that when you use Hercocel, you get not only the right material but the right *advice* in adapting this thermoplastic to your needs.

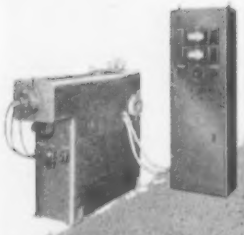
For information on Hercocel, and Hercules design assistance, technical counsel, and the facilities of our laboratories, write or call:

HERCULES POWDER COMPANY

Cellulose Products Department, 916 Market Street, Wilmington 99, Delaware

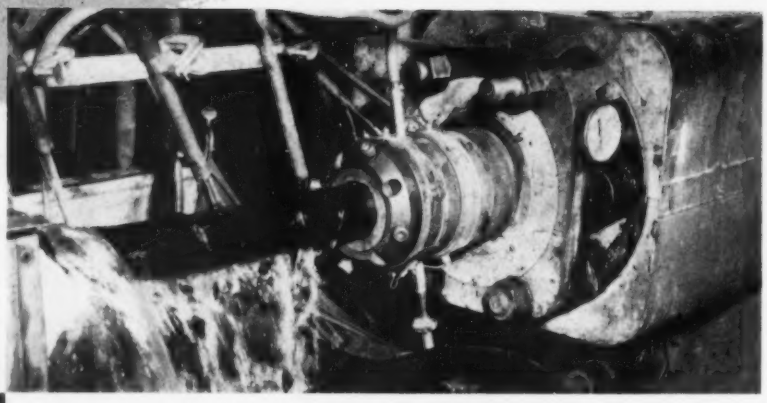

RETRACTABLE
TRAVEL BRUSH
MOTH
BALLS
CLOTHES BRUSH
NAIL FILE AND BRUSH
HERCULES
CELLULOSIC PLASTICS

CP52-9



WHY YARDLEY'S NEXT PLASTICS EXTRUDER WILL BE . . .

Another NRM



Company President F. B. Hill, Jr., (left) and C. A. Ebner, examine a sample of ribbed plastic pipe from the firm's first NRM Extruder. The machine is a 2½" oil-heated unit. Its production in the last ten years is well over a million and a half pounds of extruded plastics.

When asked why Yardley has always bought NRM Extruders, C. A. Ebner, Executive Vice President, replied: "We think NRM's design and engineering have always led the field, and production records of our machines bear us out. That's why we are 100% NRM."

The Yardley Company extrudes rigid and flexible pipe to exacting dimensions for mines, factories and water wells. Other specialties are parts for vacuum cleaners and gasketing for general sealing purposes. Many of their extruded shapes must meet rigid tolerances for fabricating into other precision-made products.

Today, in its three plants (two in Columbus, and one in Chatham, Ont., Canada) the Yardley Company operates 12 NRM Extruders, and accounts for 2,225,000 pounds of extruded plastics annually.

In less than a dozen years, Yardley Plastics Company, Columbus, Ohio, has grown from a small extrusions manufacturer with one NRM Extruder, to rank among the Nation's top extruded plastics producers.

The attitude of Yardley Plastics is typical of the feeling NRM owners the world over have about NRM Extruders. If you're planning to purchase thermoplastic extrusion equipment, look into the NRM line today. A postcard brings you full information and data, promptly, without obligation.

NATIONAL RUBBER MACHINERY COMPANY

NRM

Creative Engineering

General Offices & Engineering Laboratories: Akron 8, Ohio

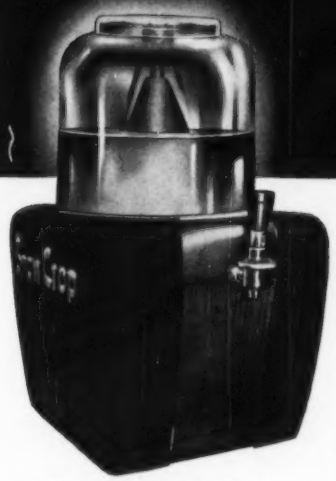
East: 384 Getty Ave., Clifton, N. J.

West: S. M. Kipp, Box 441, Pasadena 18, Cal.

Export: Omni Products Corporation, 460 Fourth Ave., New York 16, N. Y.

For Large Injection-Molded Parts . . .

PLEXIGLAS



Bowl and cap for Snow Crop dispenser, molded of clear PLEXIGLAS "V". Bowl is 10½" high, has base diameter of 12½", weighs 4.25 pounds. Injection molded on 200 oz. Watson-Stillman machine by A. L. Hyde Company, Grenloch, N. J., for Oiljak Manufacturing Company, Montclair, N. J.

PLEXIGLAS is a trade-mark, Reg. U. S. Pat Off. and other principal countries in the Western Hemisphere.

Canadian Distributor: *Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*

. . . First, because PLEXIGLAS has the right *molding* properties for successful use in big injection presses. Note this large bowl for Snow Crop frozen juice dispensers. Thanks to the excellent flow characteristics of PLEXIGLAS, thousands of these bowls have been produced, molded to close tolerances at good production rates.

. . . Second, because the *physical* properties of PLEXIGLAS insure fine appearance and performance in a molded part. Here, the requirements of exceptional clarity, resistance to chemical action, dimensional stability, and strength to withstand sudden impact, were met by use of this Rohm & Haas acrylic plastic molding powder.

Clear and colored PLEXIGLAS is being used for more and more big moldings such as bowls, car visors, diffusers for lighting fixtures, and coin phonograph panels. If *you* want the best results in molding a large part, try PLEXIGLAS . . . for size.

CHEMICALS FOR INDUSTRY

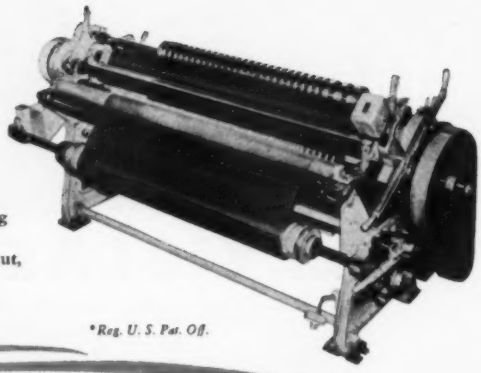
We'll be glad to send you our technical literature on PLEXIGLAS powders for injection and extrusion molding—and to discuss your specific application. Write us about your problem.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

The famous Camachine line of roll production equipment includes three standard slitter-rewinders for fast, low cost production of top-quality rolls of various types of plastic film and plastic coated materials. All three machines employ the differential rewind principle to assure rolls of uniform density regardless of caliper variation.

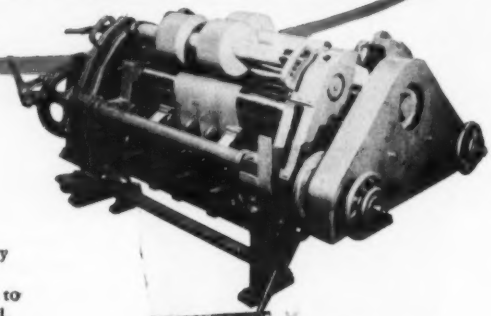


TYPE 26 A popular, versatile slitter-rewinder for the lighter gauge films rated at speeds up to 500 fpm depending upon the characteristics of the material, number of cuts, etc. May use Camachine Pneucut* pneumatic score-cut, or razor type slitter elements, or Camachine electrically heated Sealcut* slitter-fuser. Available in widths from 26" to 62". Maximum rewind diameter 17¾".

*Reg. U. S. Pat. Off.

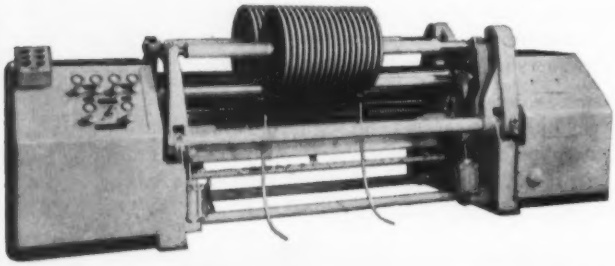
FILM SLITTERS

the right speed, the right capacity to suit various plastic films and coated materials!



TYPE 28 A heavier machine with larger rewind capacity (30" diameter). Employs either Camachine Pneucut pneumatic score-cut elements or shear-cut elements for slitting. Rated at speeds up to 800 fpm depending upon the characteristics of the material, number of cuts, etc. Built in widths from 42" to 72".

CHIEFTAIN (Type 29) A semi-automatic, heavy-duty slitter-rewinder for plastic film up to the heaviest gauge. Features a fingertip control panel. Rated at speeds up to 1500 fpm depending upon the characteristics of the material, number of cuts, etc. Built in widths from 42" to 92" with a maximum rewind capacity of 36" diameter. Employs Camachine Pneucut pneumatic slitters.



Write for literature on Camachine slitters for handling plastic film. Camachine engineers welcome the opportunity to consult with you regarding fast, low cost production of top-quality rolls.

Look for better rolls at lower cost and you'll wind up with Camachines®

AA-269 CAMERON MACHINE COMPANY • 61 POPLAR STREET • BROOKLYN 2, N. Y.

Mills Presents Another "First"

Tubes

Naturally, the first large size collapsible Polyethylene tubes made in America are a Mills product. We made our reputation in plastics doing things "first" or by doing the jobs others said were either "too tough" or "impossible."

These tubes, which were custom made for the Sue Ann Food Products, Chicago, are as distinctive an innovation in packaging as [redacted] bottles were when they first appeared. They are dent proof and durable, attractive and light, and offer functional advantages.

Let us give you full information on [redacted] TUBES. We'll gladly show what this remarkable new method of packaging can do for your products. A request on your letterhead will bring service without obligation.

Manufactured under Patent Nos. 2,161,093; 2,161,940; 2,379,899
Other patents pending

ELMER E. MILLS CORPORATION

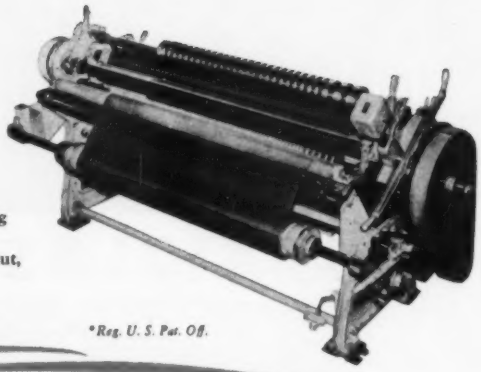
2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

Sales agents for the United States:

W. BRAUN CO., CHICAGO, 300 N. Canal St.
DETROIT, 139 W. Maple, Birmingham, Mich.
NEW YORK, 715 Fifth Ave. • ST. PAUL, 2109 Village Line

T. M. Reg.

The famous Camachine line of roll production equipment includes three standard slitter-rewinders for fast, low cost production of top-quality rolls of various types of plastic film and plastic coated materials. All three machines employ the differential rewind principle to assure rolls of uniform density regardless of caliper variation.

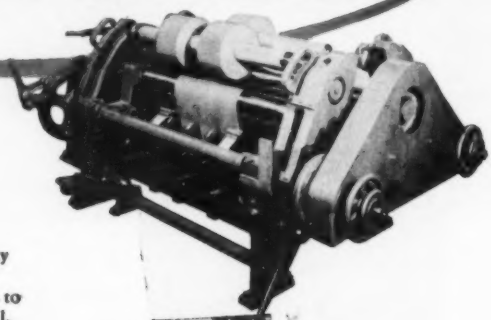


TYPE 26 A popular, versatile slitter-rewinder for the lighter gauge films rated at speeds up to 500 fpm depending upon the characteristics of the material, number of cuts, etc. May use Camachine Pneucut* pneumatic score-cut, or razor type slitter elements, or Camachine electrically heated Sealcut* slitter-fuser. Available in widths from 26" to 62". Maximum rewind diameter 17¾".

*Reg. U. S. Pat. Off.

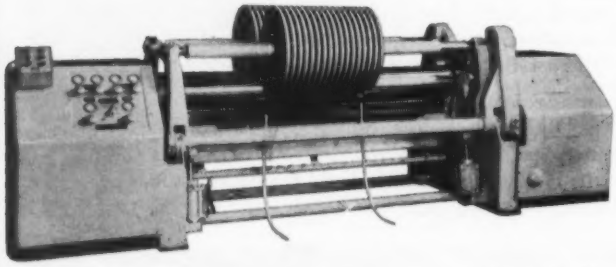
FILM SLITTERS

the right speed, the right capacity to suit various plastic films and coated materials!



TYPE 28 A heavier machine with larger rewind capacity (30" diameter). Employs either Camachine Pneucut pneumatic score-cut elements or shear-cut elements for slitting. Rated at speeds up to 800 fpm depending upon the characteristics of the material, number of cuts, etc. Built in widths from 42" to 72".

CHIEFTAIN (Type 29) A semi-automatic, heavy-duty slitter-rewinder for plastic film up to the heaviest gauge. Features a fingertip control panel. Rated at speeds up to 1500 fpm depending upon the characteristics of the material, number of cuts, etc. Built in widths from 42" to 92" with a maximum rewind capacity of 36" diameter. Employs Camachine Pneucut pneumatic slitters.



Write for literature on Camachine slitters for handling plastic film. Camachine engineers welcome the opportunity to consult with you regarding fast, low cost production of top-quality rolls.

Look for better rolls at lower cost and you'll wind up with Camachines®

AA-269 CAMERON MACHINE COMPANY • 61 POPLAR STREET • BROOKLYN 2, N. Y.

Mills Presents Another "First"

Tubes

Naturally, the first large size collapsible Polyethylene tubes made in America are a Mills product. We made our reputation in plastics doing things "first" or by doing the jobs others said were either "too tough" or "impossible."

These tubes, which were custom made for the Sue Ann Food Products, Chicago, are as distinctive an innovation in packaging as ~~GLASS~~ PLASTIC bottles were when they first appeared. They are dent-proof and durable, attractive and light, and offer functional advantages.

Let us give you full information on ~~GLASS~~ PLASTIC TUBES. We'll gladly show what this remarkable new method of packaging can do for your products. A request on your letterhead will bring service without obligation.

Manufactured under Patent Nos. 2,515,093-2,157,910-2,579,399
Other patents pending

ELMER E. MILLS CORPORATION
2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

W. BRAUN CO., CHICAGO, 300 N. Canal St.
DETROIT, 139 W. Maple, Birmingham, Mich.
NEW YORK, 715 Fifth Ave. • ST. PAUL, 2109 Village Lane

T. M. Reg.

NEED ADDITIONAL MOLD-MAKING FACILITIES?

NEED MOLDS THAT POSE ENGINEERING PROBLEMS?

NEED EXISTING MOLDS DUPLICATED?
NEED EXCEPTIONALLY LARGE OR COMPLICATED MOLDS?
NEED SMALL MOLDS . . . MULTIPLE CAVITY MOLDS?

MPc will build your plastic molds

One of the industry's best equipped and most ably staffed tool rooms is yours to use, here at **MPc**. Here you will find advanced types of equipment operated by highly skilled craftsmen. These men and machines have solved many a challenging problem in mold design and fabrication . . . problems encountered while **MPc** paced the advance to ever-larger plastic castings. Here at **MPc**, unmatched facilities and an unparalleled fund of experience are available for designing and tooling *your* plastic molds. Write to Molded Products Corporation, 4535 W. Harrison St., Chicago 24, Illinois.

Member COMMITTEE ON LARGE PLASTICS MOLDINGS of the SPI

FREE "Data Book of **MPc** Facilities," an engineering-eye view of **MPc** press capacities and other production facilities . . . together with a survey of **MPc** special skills available for your use. *Write for your copy.*

MOLD-MAKING DIVISION

MOLDED PRODUCTS

. . . Pace-Makers in Plastics Molding

LOW COST PRODUCTION MOLDING

with the LEWIS "4"

Styrene flowerpots weighing 3¼ oz. molded in 25 seconds.

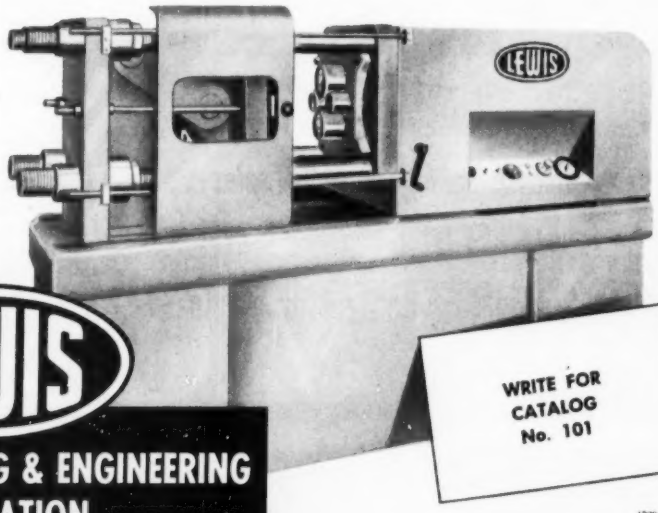
3¼ oz. polystyrene toy telephone set molded in 26 seconds.

Fluorescent styrene Christmas tree ornaments weighing 2¼ oz. molded in 21 seconds.

A real profit-maker . . . the **LEWIS "4"** is the **only** small size injection molding machine that can do the work of an 8-ounce model on light-weight jobs having large projected areas. It is the lowest cost machine available today for high-speed production of 2 to 3-ounce plastic shapes.

Only the LEWIS "4" gives you all these features: fully automatic operation, multiple shot injection, full-mold high-pressure injection at low plunger pressures, fast opening crank-operated die-lock mechanism that clears jammed nozzles in 20 seconds or less. In addition, it handles practically any molding material . . . requires less maintenance . . . uses only 16 sq. ft. of floor space.

For low-cost production molding, specify the LEWIS "4".



WRITE FOR CATALOG No. 101

LEWIS

THE LEWIS WELDING & ENGINEERING CORPORATION

1020-LW

11 INTERSTATE STREET • BEDFORD, OHIO

Smooth sailing to more sales...

MILMER 1

for mildew control in vinyls

Regardless of the type vinyl product you make—coated fabric, film, tubing or insulation—Milmer 1 can increase its selling power by increasing its mildew resistance. Scientific tests, plus actual field results, conclusively prove this product enables vinyls to resist fungi. As a result, disfiguration, embrittlement and cracking are all reduced.

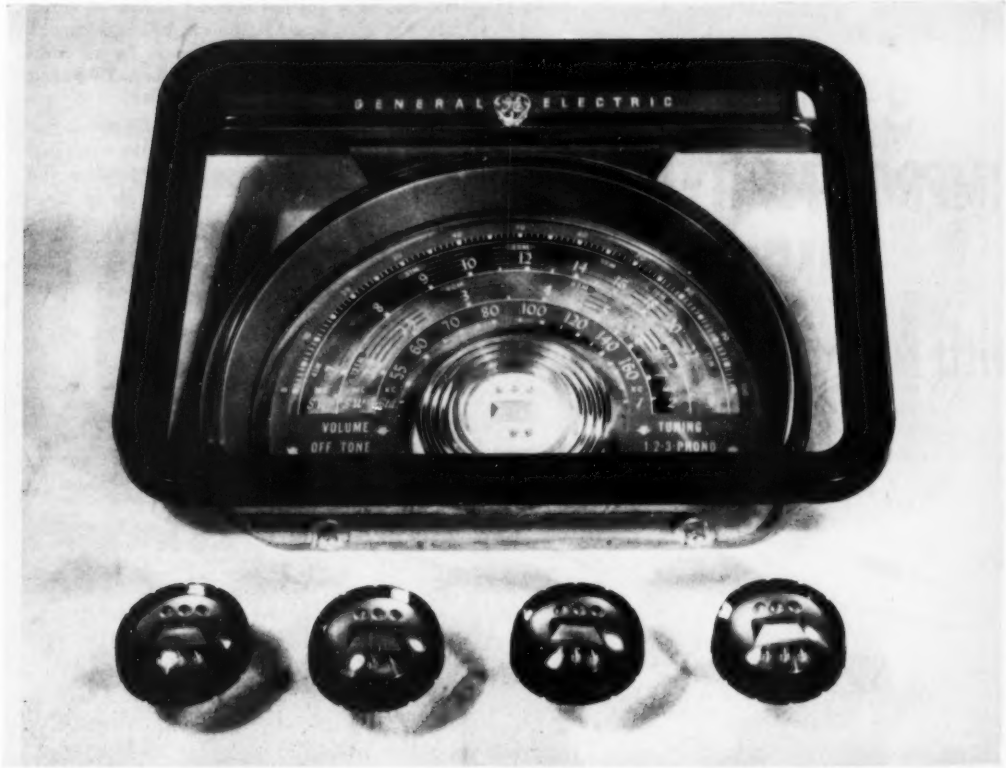
Milmer 1 can be incorporated readily and effectively into tubing, free film or coated fabric. Properly applied, it will not cause crocking, bleeding or blooming. It is nontoxic and permanent.

For more information about Milmer 1 in vinyls—or a listing of military specifications including or requiring Milmer 1—call or write MONSANTO CHEMICAL COMPANY, *Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Mo.*

Milmer: Reg. U. S. Pat. Off.

MILMER 1

MONSANTO
CHEMICALS—PLASTICS



The above photograph illustrates several parts produced for GENERAL ELECTRIC, for radio cabinet assembly. They consist of an outer escutcheon molded in opaque polystyrene; an inner escutcheon molded in clear, decorated in white and gold; dial scale molded in clear material, silk-screened with calibrations and copy; and a knob made of two pieces with the center lens section inserted in the opaque body. This complete set of parts is fitted into the front panel of one of GENERAL ELECTRIC's export models.

Our engineering staff is at your service in the development of your plastic problems whatever they may be.

CRUVER

Manufacturing Company

2460 W. JACKSON BLVD. CHICAGO 12, ILLINOIS

MOLDING • FABRICATING • LAMINATING • FINISHING

PIONEERS IN PLASTICS SINCE 1896

"BAS RELIEF" DECORATING • ASSEMBLY • SPRAYING

Branch Offices: DAYTON • DETROIT • MINNEAPOLIS • NEW YORK • PHILADELPHIA • SYRACUSE

3¾-MILLION IMPROVEMENT-EAGER FAMILIES

with Buy on their minds!

SINCE the whole plastics industry strives to create new sales advantages for products, its best customers are, naturally, those who are most eager for the latest improvements. Which exactly describes the 3¾-million families who read Better Homes & Gardens!

Every issue of BH&G is devoted exclusively to new things to try, better things to BUY. With the result that BH&G screens the nation for *only* those families who are *constantly* looking for the better things in life—and can afford them!

What better audience can a plastics advertiser have!

BH&G BUYOLOGICAL BRIEFS

- *A PLASTICS MANUFACTURER, from one BH&G ad, received 12,172 dimes for a sample of his product.*
- *1,500 BH&G READERS responded to a plastic manufacturer's first national ad in which he was seeking agents.*
- *BH&G SURVEY SHOWS 1,332,000 of its readers are in the market for plastic measuring spoons.*

MEREDITH PUBLISHING COMPANY
Des Moines, Iowa

NOMINATIONS ARE NOW BEING ACCEPTED FOR THE

TWELFTH ANNUAL AWARD

The John Wesley Hyatt Award is offered annually for outstanding achievement in the field of plastics. The Award is made by the Committee to that individual who, in its opinion, made the greatest contribution in 1952 to the progress of the plastics industry. The winner receives the John Wesley Hyatt Gold Medal and $1000.

Entries are invited from *everyone* in the plastics industry . . . *all* molders, fabricators, laminators, extruders, reinforced plastics processors, film and sheeting producers and printers, molding equipment manufacturers, and raw material producers . . . as well as chemists, laboratory technicians, toolmakers, and executives. There is no entry fee.

Statements of qualification (Entry Blanks) are now in the mail to the industry. Additional blanks or further information may be obtained from the Committee Secretary, William T. Cruse, 67 West 44th Street, New York 36, N. Y.

CP53-1

CUSTOMERS have reason to choose NORTON

THE PERFORATED gummed tape which covers the joints between adjacent sections of gypsum wallboard must be smoothed out and pressed down in order to adhere properly. To assist installers in doing the job efficiently, National Gypsum Company has followed the practice of furnishing a handy plastering paddle to each wallboard purchaser. This broad paddle, molded of the proper grade of Tenite, has a true edge and the proper degree of "flex."

Norton began molding these paddles for National Gypsum during the early 1940's. Even after metals became more available again, for reasons of low cost, they decided to have Norton continue molding them of plastic.

This decision was based on their satisfaction with Norton's flawless molding, sensible pricing, on-time deliveries, sound engineering and all-around cooperative service. These important factors have converted many other users of custom injection and compression molding to steady Norton customers.

Norton is interested in cultivating your molding business, too. Ask for a free survey of your next molding assignment by a Norton engineer from our nearest sales office. Norton Laboratories, Inc., Lockport, New York. Sales Offices: *New York—175 Fifth Avenue; Chicago—5221 Kimbark Avenue.*

NORTON *Laboratories, Inc.*

COMPRESSION AND INJECTION MOLDING

Hooker Chemical Guide
(ONE OF A SERIES)
USE this handy reference to save time in selecting high-quality chemicals.

HOOKER SOLVENTS

MONOCHLOROBENZENE

Synonym: Phenyl Chloride
Formula: C_6H_5Cl
Molecular Weight: 112.5
Appearance: Clear, colorless liquid

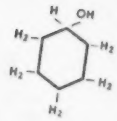
TYPICAL PROPERTIES

Freezing Point	−44° C
Distillation Range	131.2° to 132.2° C
Specific Gravity, 15.5°/15.5° C	1.114

USES

INSECTICIDAL INTERMEDIATE: DDT and other insecticides.
DYESTUFF INTERMEDIATE: Sulfur black and brown dyes.
CHEMICAL INTERMEDIATE: Organic synthesis.
SOLVENT: Paints, varnishes, lacquers, paint removers; general use.
HEAT TRANSFER FLUID: Suggested for condensing vapor systems, such as glass-enameled vessel jackets, which cannot stand high steam pressures.

CYCLOHEXANOL



Synonym: Hexahydrophenol
Formula: $C_6H_{11}OH$
Molecular Weight: 100.1
Appearance: Viscous, colorless liquid with pleasant, aromatic odor.

TYPICAL PROPERTIES

	High Grade	Tech. Grade
Freezing Range	18° to 22° C	−10° C to −20° C
Boiling Point	161.7° C	161.7° C
Specific Gravity, 25°/15.5° C	0.945	0.939
Flash Point	67° C	61° C

USES

SOLVENT: For resins, metallic soaps, dyes, fats and oils.
BLENDING AND STABILIZING AGENT: In textile soaps and dry cleaning agents.
HOMOGENIZING AGENT: For lacquers, varnishes and paints.
ALSO USED: In furniture and metal polishes, shoe creams, floor waxes, degreasing of leather, lubricating oils, also a plasticizer and ingredient of adhesives, and as a chemical intermediate in organic synthesis.

MONOCHLOROTOLUENE

Synonym: Methylchlorobenzene
Formula: $CH_3C_6H_4Cl$
Molecular Weight: 126.5
Appearance: Clear, colorless to straw-colored liquid.

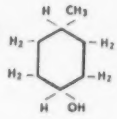
TYPICAL PROPERTIES

Freezing Point	below −45° C
Distillation Range	158.3° to 161.7° C
Specific Gravity, 15.5°/15.5° C	1.080

USES

SOLVENT: Rubber and synthetic resins.
INTERMEDIATE: Manufacture of rubber accelerators, chemicals.

METHYL CYCLOHEXANOL



Synonym: Hexahydrocresol
Formula: $CH_3C_6H_{11}OH$
Molecular Weight: 114.1
Appearance: Light straw-colored, neutral, viscous liquid.

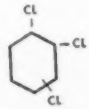
TYPICAL PROPERTIES

Distillation Range	155° to 180° C
Specific Gravity, 15.5°/15.5° C	0.924
Flash and Fire Points	71° C

USES

SOLVENT: For cellulose acetate, nitrocellulose and other cellulose esters for lacquers and coating compositions.
ANTI-OXIDANT: In lubricants.
BLENDING AGENT: For special textile soaps and detergents.

TRICHLOROBENZENE, Tech.



Formula: $C_6H_3Cl_3$
Molecular Weight: 181.5
Appearance: Clear, almost colorless liquid

TYPICAL PROPERTIES

Freezing Point	10° C
Distillation Range	5° incl. 216° C
Specific Gravity, 15.5°/15.5° C	1.466

USES

INSECTICIDE: Soil poison for termites.
SOLVENT: Fats, oils, waxes, resins; crystallization solvent.
HEAT TRANSFER MEDIUM: Condensing vapor systems, 210° to 300° C.
DIELECTRIC FLUID: Transformers.
INTERMEDIATE: Dye intermediates, other organic chemicals.

• *For more information on items listed,* drop a note on your letterhead to:

HOOKER ELECTROCHEMICAL COMPANY
18 Forty-Seventh St., Niagara Falls, N. Y.

HOOKER ELECTROCHEMICAL COMPANY

NIAGARA FALLS, N. Y. • NEW YORK, N. Y.
TACOMA, WASH. • CHICAGO, ILL. • WILMINGTON, CALIF.

From the Salt of the Earth

HOOKER CHEMICALS

2-1520

When you think of THE Z-TYPE CALENDER you are thinking of FARREL-BIRMINGHAM®

Originated and developed by Farrel-Birmingham engineers, the Z-type calender has established new standards for accuracy in calendering both rubber and plastics. It has proved to be equally outstanding for the high-speed production of film and sheet, and for single and double coating.

The company has also specialized in engineering complete calender trains, incorporating an embosser, cooling train and windup. Other units, such as Banbury mixers and mills, matched in capacity with the calender train, can also be supplied to make production a single integrated operation.

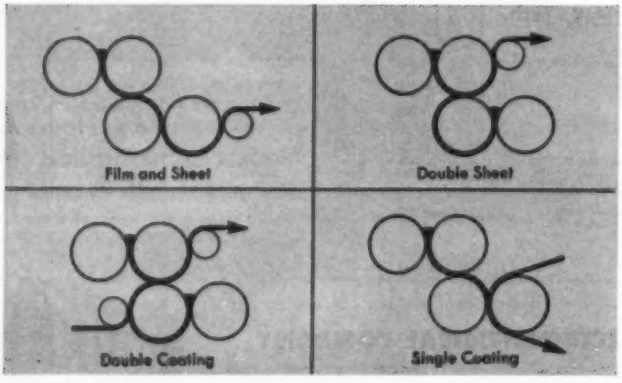
Farrel-Birmingham engineers will be glad to discuss your calendering problems with you.

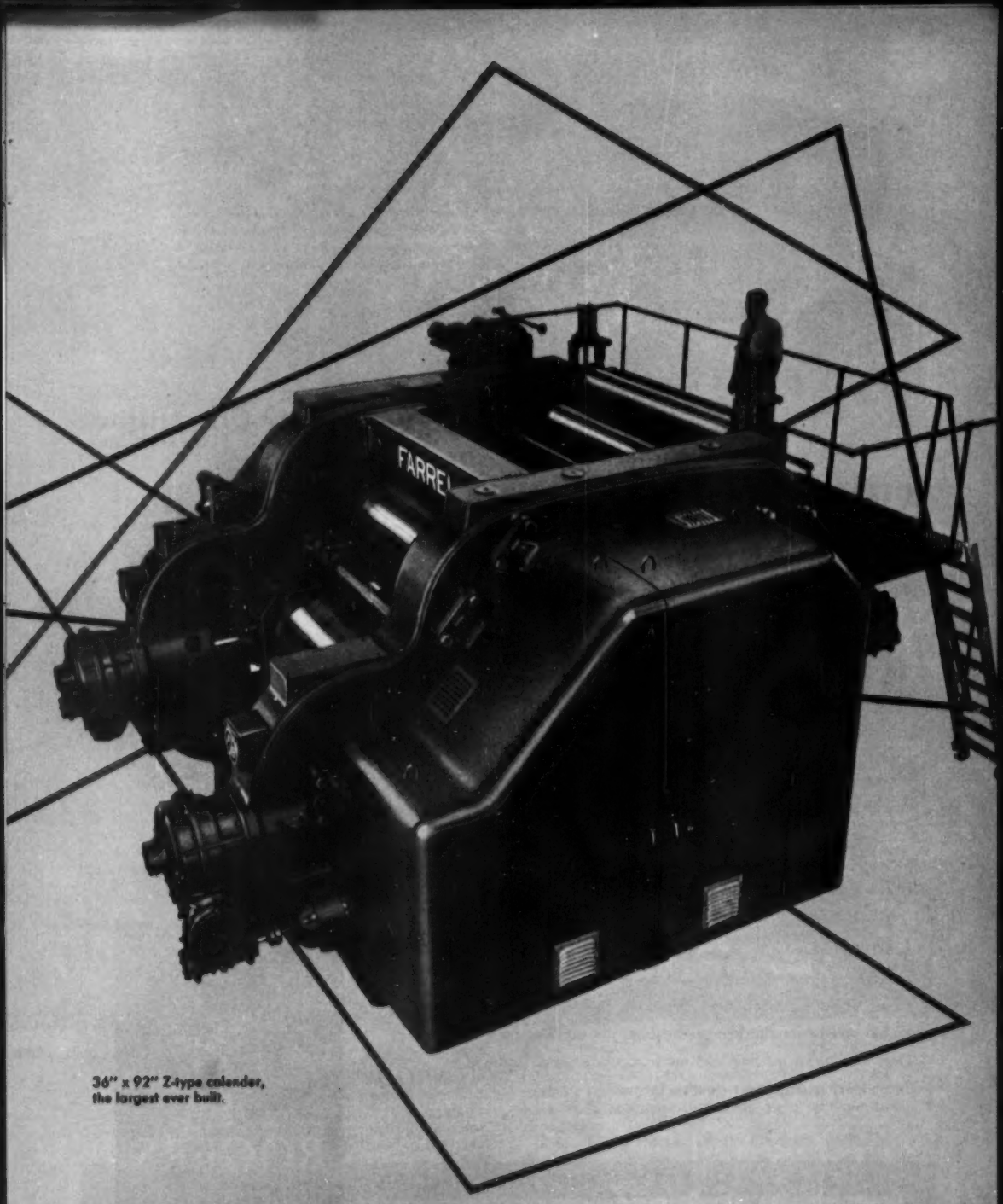
When you think of the Z-type calender, you are thinking of Farrel-Birmingham.

FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

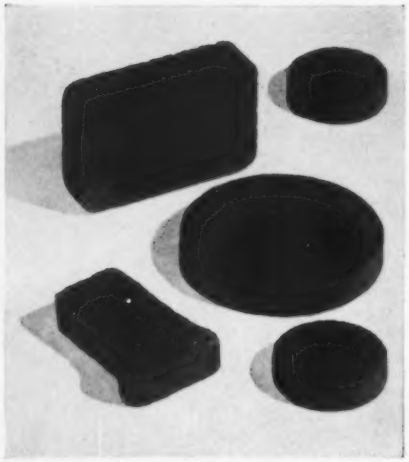




36" x 92" Z-type calender,
the largest ever built.

Farrel-Birmingham®

PB-790



PREFORMS made of Rogers RX impact phenolics are uniform and dense. Will withstand rough handling without fracturing. Preform weights can be held consistently to close tolerances — as close as 1% in many cases. Pills are clean and easy to handle.

Why ROGERS CORPORATION Impact Phenolics SIMPLIFY PRODUCTION of High Strength Parts

ALL GRADES CAN BE AUTOMATICALLY PREFORMED

Rogers RX preformable phenolics are supplied in the impact range of 0.5 foot pounds per inch of notch (Izod) to 1.1. All standard and special grades combine a low bulk factor of approximately 3.5 to 1 with uniform pellet size. In addition, the materials are clean, dustless and pour uniformly.

These properties make it easy for you to produce accurate preforms at high speed, using conventional automatic tabletting equipment. Uniform preforms, in turn, enable you to standardize pre-heating and molding cycles. They also mean quicker and more accurate press loading, thus assuring consistent quality in molded parts.

WITH ROGERS RX impact phenolics, you can produce high strength parts at low unit cost. For more details, please write for our catalog of data sheets — Dept. P, Rogers Corporation, Manchester, Connecticut.

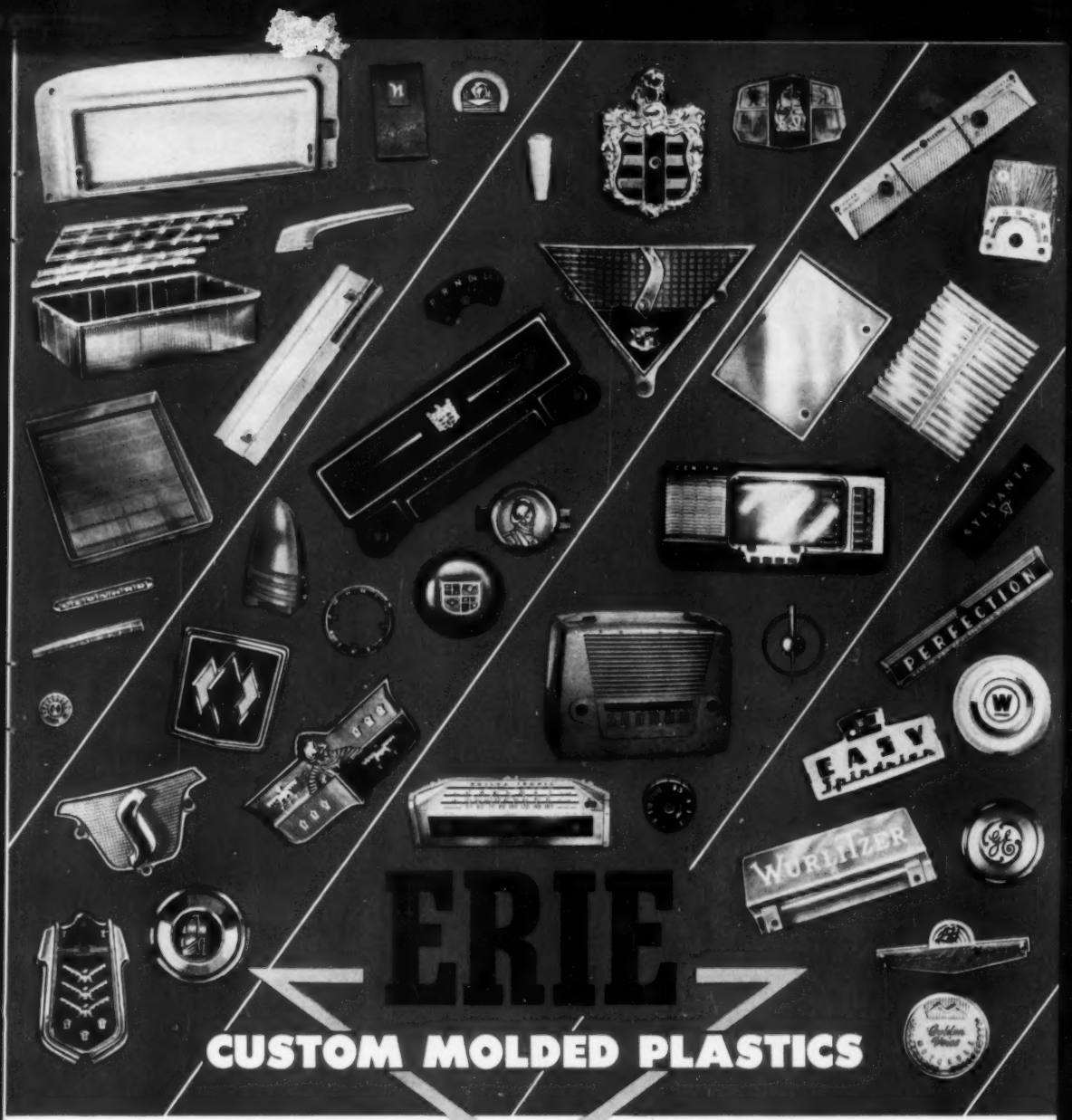
Better Parts for Better Products

ROGERS CORPORATION

Established in 1832

YOU NAME IT—WE'LL MAKE IT—AND FABRICATE IT, TOO

DUROIDS for Gaskets, Filters, Electronics . . .	ELECTRICAL INSULATION for Motors, Transformers, Generators . .	PLASTICS Molding Compounds and Laminates	SHOE MATERIALS for Counters, Midsoles, Liners . . .	FABRICATING Producing parts from Rogers materials



Anything in Custom Injection Molded Plastics is a job for Erie . . . the pioneer in custom injection molded plastics. Large or small . . . flat or deep . . . crystal clear or opaque . . . simple or complicated in design . . . Erie can show you pieces produced for manufacturers in almost every known industry.

Pieces that require exacting tolerances . . . interchangeable parts, mating parts, threaded parts . . . Erie can meet any difficulties you may have with solutions that have been proven in production.

Erie Three Dimensional Plastics, used as decorative trademarks or name plates, or embodied in functional parts, are truly breathtaking in their imperishable beauty.

Write for your copy of bulletin, "Who We Are . . . What We Do in Plastics."

TRADE ERIE MARK
RESISTOR CORP.

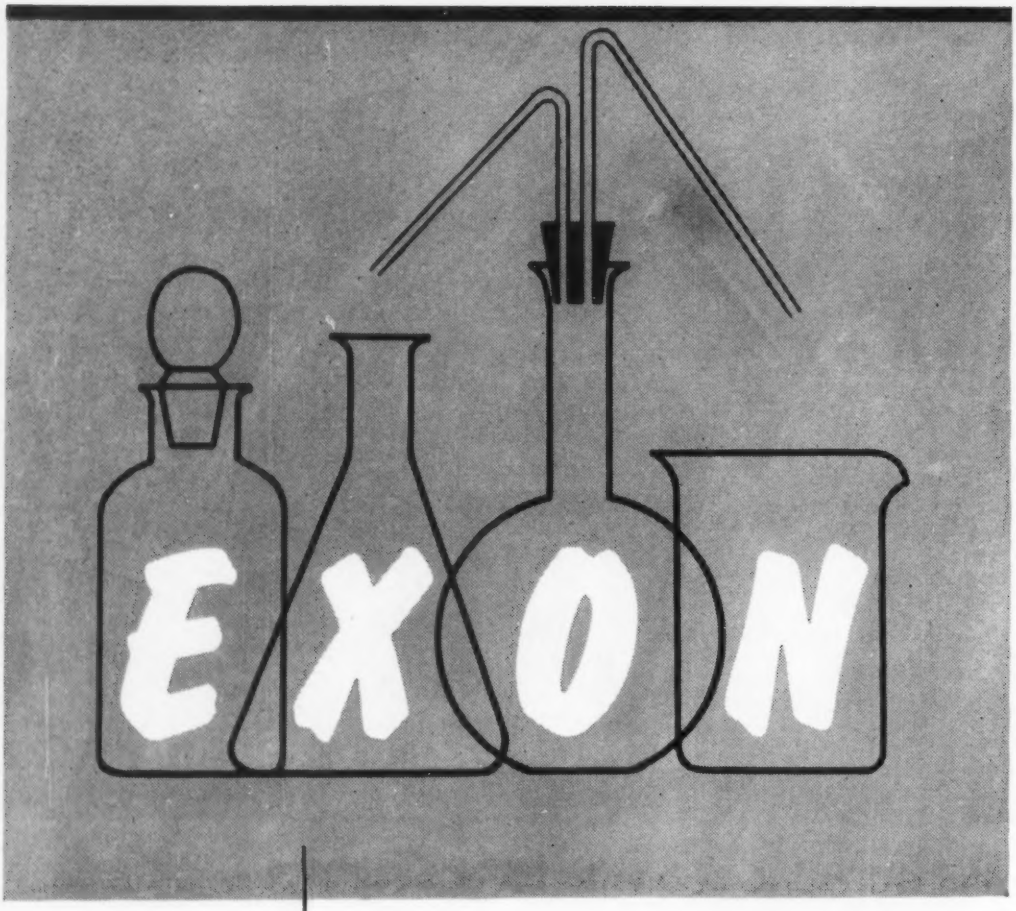
ERIE RESISTOR CORPORATION . . . . . PLASTICS DIVISION

Main Offices: **ERIE, PA.**

Sales Offices: Cliffside, N. J. • Philadelphia, Pa. • Buffalo, N. Y. • Chicago, Ill. Detroit, Mich. • Cincinnati, Ohio • Los Angeles, Calif.

Factories: **ERIE, PA. • LONDON, ENGLAND • TORONTO, CANADA**

Firestone EXON



For further detailed information on any or all of these EXON resins, call or write:

CHEMICAL SALES DIVISION, Dept. 8B
FIRESTONE PLASTICS CO., POTTSTOWN, PA.

ASSURES YOU OF SUPERIOR RESINS

FOR SUPERIOR FINISHED PRODUCTS

In the Plastics Industry, it is a known fact that Firestone EXON comprises one of the most versatile lines of vinyl resins available. America's leading plastics manufacturers are using EXON resins. They know that Firestone's never-ending research, technical service, and standardization policy assures them of raw materials of the highest quality—and therefore, a superior finished product. Check the properties of the EXON resins listed on this page. See how *you* can use them to advantage in *your* manufacturing processes.

THESE EXON RESINS CAN IMPROVE YOUR PRODUCT AND CUT PRODUCTION COSTS

EXON 402A—A modified polyvinyl chloride resin of moderately high molecular weight. This resin has unusual versatility in that it may be used in both plasticized and unplasticized formulations.

EXON 500—A high molecular weight polyvinyl chloride resin. Excellent electrical properties, color, heat and light stability, physical toughness and chemical inertness. Specifically designed for wire covering purposes.

EXON 900A—A high molecular weight general purpose polyvinyl chloride resin. Has excellent color, heat and light stability, toughness, chemical inertness and easy processing.

EXON 450—A vinyl chloride copolymer of intermediate molecular weight. Can be used as a soft compounding resin or alone in rigid sheeting. This resin possesses unique solution qualities suitable for many applications.

EXON 654—A polyvinyl chloride resin which can be readily dispersed in plasticizer to form a plastisol paste to which it imparts excellent heat and light stability, physical toughness and chemical inertness. This resin is currently available in limited quantities only.

These new Exon Resins will soon be available

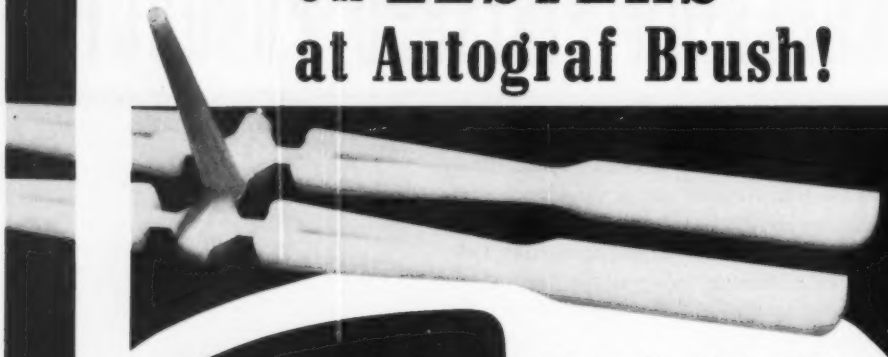
•

EXON 400 XR-61—A fluorinated thermoplastic resin which shows the characteristic excellent chemical and aging resistance of fluorine containing resins with the added advantage of being soluble in certain solvents for coating.

EXON 700 XR-59—A latex of high solids concentration containing a vinyl chloride polymer. The latex has excellent mechanical stability and is adapted to film forming and impregnating operations, producing films with good heat and light stability.

EXON 800 XR-60—A tough, rigid thermoplastic resin having high impact strength, excellent dimensional stability and electrical properties. Can be calendered, laminated, formed, injection and compression molded, or extruded in conventional plastics equipment.

5 years of Nylon molding on *LESTERS* at Autograf Brush!



This gate of brush-backs, weighing 8 ounces, is molded by Autograf Brush & Plastics Co. for Stanley Home Products, Inc. on a 12 ounce Lester. It's a tough job—It must have perfect finish, fine color, and be free of porosity for bristling. But it's a routine job for Autograf. For five years they have been running nylon *regularly* on their Lesters.

The Lester Nylon Cut-off Attachment is the key to trouble-free nylon molding. Positive, *mechanical* action completely eliminates drooling. Internal heat in the spreader ups production. With 4-zone heater control, color and physical properties are consistently better.

If you are interested in top quality production of *all* thermoplastics, write for complete specifications on the Lesters—4 to 48 ounces.

Write for the Lester-Phoenix house organ, "The Lester Press".

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621-F CHURCH AVENUE • CLEVELAND 13, OHIO

REPRESENTATIVES

New York . . . . Steven F. Krould
Detroit . . . . . Thoreson-McCosh
Chicago . . . . . J. J. Schmidt
Cleveland . . . . . Don Williams
Cincinnati . . . Index Machinery Corp.
Los Angeles . . . Seaboard Machinery Co
San Francisco . . . . . J. Fraser Rae
St. Louis, Milwaukee . . . . A. B. Geers
Providence . . . . . Sydney W. Lohman

FOREIGN

Toronto, Canada . Modern Tool Works, Ltd.
London, England . . . . Dowding & Doll, Ltd.
Sydney, Australia . . . Scott & Holladay, Ltd.
Japan . . . . Okura & Co., New York, Inc.

Uniform gage maintained with calender rolls on TIMKEN® bearings

Roll neck wear is eliminated

WITH calender rolls mounted on Timken® tapered roller bearings, the gage of plastic film and rubber sheeting is maintained longer than is possible with sleeve type bearings. Rolls stay in accurate alignment maintaining uniform gage the length and breadth of the sheet.

Since there is no friction between roll neck and bearing, roll neck wear is eliminated. Calenders maintain precision with fewer overhauls. And downtime is minimized since roll necks don't require machining.

The true rolling motion of Timken bearings, plus the smooth surface finish of rollers and races, virtually eliminate friction. Wear within the bearing is negligible, calender roll precision is maintained for longer periods of time.

With Timken bearings, calenders can hold gage to minimum tolerances. Yield is increased — you get more yards per pound. Tapered construction of Timken bearings permits them to take radial and thrust loads in any combination. And due to line contact between rollers and races, Timken bearings have load carrying capacity to spare.

Get the advantages of Timken bearings in your calenders, mills, refiners and mixers. For full information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

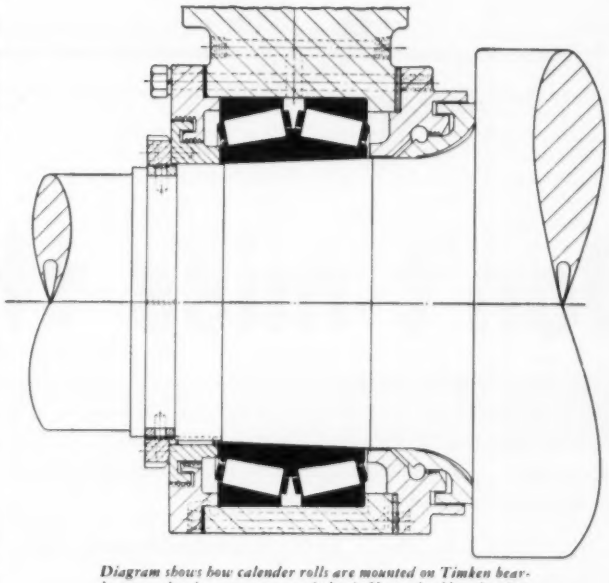


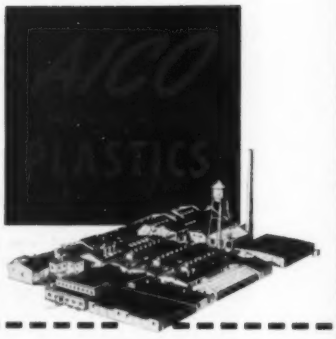
Diagram shows how calender rolls are mounted on Timken bearings to maintain accurate gage of plastic film and rubber sheeting.

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◇ AND THRUST ◇ LOADS OR ANY COMBINATION

Don't miss the boat

Jump aboard . . . ride the cost and trading advantages of plastics to increased profits. Plastic parts are easily molded to extremely close tolerances . . . eliminate many production steps entirely to cut costs. The pleasing texture . . . adaptability to unique design . . . and unlimited color range of molded plastics assure smooth selling ahead for your products.



Send for Free AICO Plastics Applicator

FREE *Aico Plastics Applicator picks the right plastic for your product. A turn of its dial automatically selects the three best plastics for each purpose . . . even indicates the best molding method for each! Send for your Plastics Applicator and see how it can help you score extra profits. Mail the coupon today.*

American Insulator Corporation

New Freedom, Pennsylvania

Please send my free Plastics Applicator immediately.

NAME: _____

POSITION: _____

COMPANY: _____

ADDRESS: _____

☐ Have your representative call on me.

AICO'S COMPLETE PLASTIC MOLDING SERVICE INCLUDES: Engineering Counsel; Mold Building; Injection, Compression and Cold Molding plus the molding of reinforced plastics.

MODERN PLASTICS

JANUARY 1953 VOL. 30, NO. 5

Plastics Industry Trends

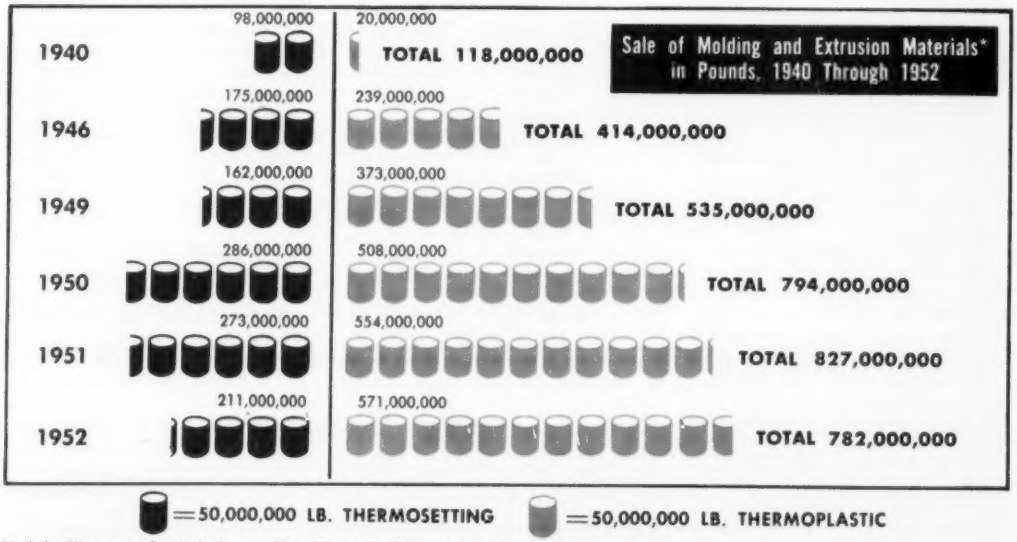
THERE was no landslide in the plastics industry in 1952. Early in the year, there was some fear of a backslide. However, a big upsurge, starting in August, brought volume up at least even with 1951; if last quarter estimates live up to expectations, there will be a small increase over 1951.

The decline of plastics materials sales in the first half of 1952 was a continuation of the drop that started in mid-summer 1951. It followed closely the general decline in nearly all business volume. As a result, nearly all materials manufacturers and plastics processors came into 1952 with over-large inventories.

An exception in the plastics decline for early 1952 was vinyl wire-coating materials which moved ahead of the 1951 average because copper shortages hindered wire production in that year and military demand remained at a high level. Vinyl sheeting for upholstery and kindred items also increased their early 1952 volume over 1951. Phenolic and urea adhesives for plywood also held up surprisingly well in this period.

The increase in sales of thermoplastic molding and extrusion materials as shown in the chart at the bottom of this page was influenced largely by the new increments of polyethylene which became available during the year and the above mentioned increase in vinyl extrusion material for wire coating.

MODERN PLASTICS estimates for plastics industry statistics generally are quite different from those of any other source. In fact, there are almost as many different estimates on plastics volume as there are people who make them. The reasons for



*Includes fillers except for vinyls. Sources: United States Tariff Commission; MODERN PLASTICS estimates

these discrepancies are as follows:

1) Figures in this article are based on sales volume. In both 1951 and 1952, the difference between production and sales volume has been quite marked due to rapidly changing fluctuations in over-all business trends. In other years since World War II, sales and production volume have been approximately the same.

2) The last four months of 1952 must of necessity be estimated. The last four months of 1951 and 1952 have seen remarkable reversals. In 1951, sales volume dropped precipitately. In 1952, sales volume shot upward as fast as, if not faster than, it went downward in the previous year.

In 1951, most prognosticators of industry trends were over-optimistic in their estimates for the last quarter—few anticipated the extent of the decline, which was especially severe in December 1951. This year these estimators were extremely cautious. It would not be surprising to see the totals presented here exceeded in almost every classification.

3) There are so many things frequently included in plastics nomenclature that every man's conclusions are going to be different unless he defines his limits. For example, the most commonly used plastics volume figure, even by S.P.I., is the U. S. Tariff Commission's Summary on Plastics and Synthetic Resin Production. A good portion of the resins named in that report never enter the plastics industry insofar as MODERN PLASTICS is primarily concerned. For example, this magazine seldom delves into the affairs of the paint, varnish, and lacquer industry, yet coating resins used for those purposes account for some 600 million lb. or so of the volume reported in the Tariff Commission summary, as shown in the table on page 61. If the coating resins were added to the totals shown in Table A, the figures given there would correspond closely to Tariff Commission summaries.

Our purpose in compiling these statistics is to confine them as closely as possible to cellulosics and synthetic resins used where plastics are recognized as basic materials which the company uses to form all or part of its products. Such items as brake linings, abrasives, and plywood are included because plastics resins have been generally recognized as fundamentally responsible for the development of these products into their present-day efficiency. On the other hand, the paint and woven fabric industries, which turn great quantities of synthetic resins into consumer products, are industries in their own right which seldom claim any affiliation with plastics. They are industries with age-old traditions to whom new materials are simply improvements and extensions of their present lines.

Camera and movie film are more difficult to define as belonging in or out of the plastics industry, but no figures are available on their production volume, anyhow.

So far as is known, no statistics have ever been compiled which show the complete magnitude of this broad field. If the total of all the materials used in plastics products; in paint; in lacquer; in varnish; in camera and movie film; in fabrics (including rayon); and in plasticizers and fillers, was ever totaled, the result would be astounding.

TABLE A—SALES IN POUNDS OF SYNTHETIC RESINS AND CELLULOSICS USED IN PLASTICS[a]

	1946	*1950*	*1951*	*1952*
Cellulose acetate[1] and mixed esters				
Film, sheets, rods, tubes	19,900,000	27,500,000	30,600,000	26,100,000
Molding and extrusion	83,200,000	80,000,000	62,200,000	57,800,000
Nitrocellulose sheets, rods, tubes	18,300,000	7,400,000	6,800,000	5,900,000
Other cellulose plastics[1,2,4]	12,200,000	12,600,000	10,800,000	6,500,000
Phenolic and other tar acid resins[1,3,4,5]	241,700,000	372,200,000	389,200,000	329,700,000
Urea and melamine[1,3,4]	89,300,000	185,100,000	196,800,000	194,000,000
Styrene and styrene derivative polymer and copolymer resins [1,4]	66,800,000	332,000,000	308,000,000	304,000,000
Vinyl resins [4,5]	152,700,000	302,000,000	388,000,000	400,000,000
Coumarone indene and petroleum polymer resins		143,600,000	173,300,000	175,000,000
Miscellaneous				
Molding materials[6]	15,000,000	60,300,000	73,500,000	130,000,000
Other uses[7,9]	35,700,000	59,100,000	60,800,000	90,000,000
TOTAL	734,800,000	1,581,800,000	1,700,000,000	1,719,000,000

[a] Source: U.S. Tariff Commission for all except estimated last four months of 1952. Production figures are used for 1946 because sales figures were not available in that year. However, production and sales were so close together in that year that the difference is not significant for comparative purposes.
[1] Includes fillers, plasticizers, and extenders.
[2] Includes sheets, rods, tubes, and molding and extrusion materials, primarily ethyl cellulose and Valite.
[3] All dry resin except molding material which includes filler.
[4] Excludes data on protective coating.
[5] The 1946 figure includes an unknown quantity of filler used in vinyl film and sheet. About 100 million lb. is deducted from the 1950 figure, for at that time Tariff Commission figures included filler used in film and sheeting. Figure is for all vinyls, including saran, vinyl butyral, vinyl chloride and copolymers, vinyl acetate, vinyl alcohol, and vinyl formal.
[6] Includes acrylic, polyethylene, nylon, and other miscellaneous molding materials.
[7] Includes acrylic sheet, nylon, silicone, and hydrocarbons. Petroleum resins and coumarone indene are included in miscellaneous in 1946.
[8] Production figure used instead of sales figure for laminating resins because many laminators produce a large amount of their own resin.
[9] Includes protective coating resins for every year except 1951 which was first year that coatings were given separately in Tariff Commission report. Coumarone indene and petroleum resins were included here in 1946.

Materials Supply and Demand

FOR a material that has been called the "work horse" of the plastics industry, phenolics do more "horsing around," especially in the molding material category, than one would expect from a steady old steed hitched to a milk wagon. Friskiness might be expected from younger and so-called glamorous thermoplastic gallopers, but that supposedly steady old thermosetting plug sometimes changes from sluggishness to friskiness and back again more rapidly than her galloping young cousins.

The above observation is supported by phenolic molding powder sales figures for 1952. They varied from a low of a little more than 8 million lb. in July to a sudden upsurge in the fall to an estimated 17 or 18 million lb. a month. There were even veiled hints of a temporary scarcity if demand continued on the upgrade so rapidly. Many facilities for producing molding material had been curtailed and the heavy demand in the fall came faster than these facilities could be put back into full scale operation to meet all the requirements of the sudden increase in demand.

There is no anticipated shortage of phenol or formaldehyde and there are plenty of facilities to make much more molding compound, but it takes time to get them into operation. It is probable that the industry could produce as much as 35 million lb. a month, or even more if hard pressed, provided time was available to get going and there was plenty of raw material. However, no one is anticipating a date when the industry will arrive at that figure, if ever. The highest sales month in history was August 1950 with 21,800,000 pounds.

Consumption Figures

The record for consumption of phenol-formaldehyde type molding compound by years since 1946 is as follows:

1946	140,000,000 lb.
1947	194,000,000 lb.
1948	171,000,000 lb.
1949	117,000,000 lb.
*1950	195,000,000 lb.
*1951	205,000,000 lb.
*1952	160,000,000 lb. (estimated)

*Includes a million or so pounds of casting material.

In 1946, there was a 100-day strike in the plant of the largest producer; 1947 was a boom year for everything; in 1948, there was a bad slump from April to August—consumption dropped from almost 20 million lb. in March to 11 million lb. in July, and back to over 16.5 million lb. in October. This was followed by a severe, abrupt drop to around 5 million lb. in July 1949 and then a sudden jump back up to 15 million lb. in October 1949; and the country was off on a big production splurge that was further amplified by the Korean War, starting in June 1950. In the 12 months from July 1, 1950 to June 30, 1951, more than 217 million lb. of phenolic molding powder were sold—an average of over 18 million lb. a month. A decline set in during the last quarter of 1951 when sales dropped from 20 million lb. in October to 12.5 million lb. in December, and continued down to a low of 8 million lb. in July 1952. In the fall of 1952, monthly sales are estimated to be over 15 million lb. again.

Thus in a branch of plastics that is often thought to be a stabilizer of the industry there is a spread of consumption from 5 to 22 million lb. a month, with an average of 14 million.

But as in so many cases, the average is not believed to be a true indicator. The industry has been growing since it came out of World War II with a 12 million lb. monthly production rate. There have been many adverse factors such as shortages of phenol and formaldehyde; strikes in the coal and steel industry that affected phenol deliveries; strikes in the plastics industry; an unnatural demand and unnatural slumps in consumer purchasing. Many observers believe that the phenolic molding powder industry would be in the 16 or 17 million lb. per month class today if allowed to take a normal course, and that even without development of new end products it will continue to expand to meet population growth.

Fluctuations, of course, will continue to occur. But it is believed that those caused by shortages of raw materials will never again be so severe as they have been in the past. However, it must not be forgotten that phenolics are tied more closely to heavy industry than to consumer products. They will continue to follow the ups and downs of steel, electrical parts, automotive applications, and the like, which tend to fluctuate a bit more precipitately than consumer goods.

Large Inventories

The 1952 decline in sales of molding powder was partially due to large inventories built up at the close of 1951 by molders and users of such molded items as handles for electrical appliances.

It is believed that raw material producers suffered more than molders in 1952. The molders' sales were off only 9% in the first six months compared to a 30% or more decline in raw materials, according to The Society of the Plastics Industry. But the decline in production of nearly all types of industrial civilian goods such as autos, appliances, closures, and cooking utensils couldn't help but take a wicked cut at phenolic production. The one segment for which there is no immediate ex-

planation is that embracing wiring devices. Home and industrial construction went merrily along and they all need wiring. Perhaps inventories had been built up too heavily in 1951.

It is safe to say, however, that phenolics apparently didn't lose out to any of their plastics competitors during the 1952 slump. When business started to come back in August and jumped to 13 million lb. from 8 million in July, the orders were etc. But what are the chances of ever getting up to that possible 35 million lb. a month capacity for molding materials?

Following are some notes on possible developments along that line as seen at present. But first it should be pointed out that when sales were about 17 or 18 million lb. a month during the recent scarcity era it was indicated that demand would have been 6 or 7 million lb. more if the metal and wood indus-

Table B—Phenolic Resin Sales in Pounds [a, b]

	First 8 mo. 1952	*Estimated last 4 mo.*	*Total 1952*	*Total 1951*	*Total 1950*
Laminating resins[c]	41,400,000	29,600,000	71,000,000	74,200,000	75,400,000
Adhesive resins[d]	24,900,000	14,800,000	39,700,000	38,000,000	29,300,000
Molding and casting	89,800,000	70,200,000	160,000,000	205,000,000	195,000,000
Miscellaneous for other than protective coatings	36,000,000	23,000,000	59,000,000	71,200,000	73,000,000
TOTAL			329,700,000	388,400,000	372,700,000

[a] Source for 1950, 1951, and first eight months 1952: U. S. Tariff Commission; last four months 1952 estimated.

[b] All on solid resin basis except molding compound, which includes filler.

[c] Production figures used instead of sales for laminating resin because many firms make and use large quantities of their own resin.

[d] Attention should also be called to production figure which runs 3 to 4 million lb. higher than sales figure since at least 14% of resin used by plywood companies is produced by the user and would not show in sales figure.

across the board from buttons and closures to television cabinets and circuit breakers.

Military business in phenolics is a mystery. Some molders have fair amounts, but most have none. There are beginning to be doubts that there would be anywhere near enough military business to occupy any great portion of the industry's facilities even in the event of an all-out emergency. If the government is holding back the phenolic business as a secret from the enemy it is also keeping it a secret from the molders.

Production to Double

The biggest item of interest in the phenolic industry is the government's plan to pave the way for almost doubling phenolic resin production capacity by 1955. The bulk of that expansion will go into other types of phenolic resins such as used in shell molding, wood waste,

tries which use plastic parts had not been held back by shortages. But when metal and wood became more free there was less instead of more demand for phenolics. One answer to that enigma would seem to be that phenolic molders must expand their present lines and develop new products if they are ever to get above that 20 million lb. a month figure and stay there.

Washing machine agitators are an example. There seems to be a difference of opinion about what is going on in this industry. The phenolic industry claims around 75% of the business, but there is evidence that this percentage fluctuates according to the availability of aluminum. In 1950, the agitator business accounted for almost 13 million lb. of phenolics, but there are doubts that it is anywhere near that figure for 1952. The plastic industry cannot rest on its oars in the belief that this field is completely won over—apparently washing machine manufacturers have to be convinced and then re-convinced almost every year.

Electrical Uses

Vacuum tube bases today require an estimated 10 to 12 million lb. of phenolic resin a year. Electrical amplifiers are going through an experimental period; transistors may possibly eliminate the need for many tubes. There have also been increases in tubes without bases and others that use a phenolic wafer base instead of side walls, thus reducing the amount of resin used. On the other hand, the usage of vacuum tubes is increasing so rapidly that the big producers are today making more phenolic base tubes than ever before. This looks like a good phenolic outlet for years to come despite the threat of new designs.

Phenolic television cabinets are made by only three or four companies. Several others are interested and there is lots of room for expansion. Some manufacturers went back to plywood when that material dropped in cost after the scarcity period. Urea people think they may get some of the business eventually but phenolic people say urea doesn't have the right properties. Some television cabinet producers shy away from the high mold cost for plastics. But those who are using phenolic keep right on moving ahead. They must have good reasons. Maybe the gospel needs to be spread among 20 or 30 other producers.

Air conditioner housings molded of phenolic are now under test. It has been suggested that they should be reinforced with a laminate for a more satisfactory job. A tremendous new field is opening up if this application can be conquered.

A report from *British Plastics* points out another possibility in large molded pieces. It is a 12- by 3-ft. reflector for a radar aerial molded in phenolic-asbestos, incorporates a honeycomb core, and is metallic coated.

Furniture

Phenolic dressers, medicine cabinets, and other drawer-type furniture have aroused lots of interest and lots of quotations. But when wood prices went down so did some

of the interest. It took 10 years to put over phenolic handles for electric irons. It is going to take a long time to do the same for furniture.

In fields such as furniture the industry may profit from studying further possibilities of spray or baked coatings. One company has made toilet seats and covers by roughening the surface and baking on an applied coating. Solid-color phenolics are of course a possibility in the future, but they will likely be more costly than the coated product.

Automotive

Metallic coating of phenolic has been a disappointment so far in regard to volume—in fact there has been almost none. The process requires a large investment and has not yet been perfected, but has advantages over zinc if present problems can be overcome. Automotive grilles and handles are a tempting field for metallized phenolics which, if it ever reaches perfection, could absorb 35 to 40 million lb. of resin a month.

The automotive industry is using less phenolic per car than it did in the early days when there were phenolic handles and buttons as well as electric parts. Probably not more than 1½ lb. is used per car today.

Handles and parts of electrical appliances exclusive of washing machines, plus wiring devices, have been known to require more than 50 million lb. of phenolic resin in a year. This field is always open for new ideas. The phenolic iron handle, for example, was practically carried around in a suit case for many years as an interesting idea until it started to take hold just before World War II.

Closures of phenolic are steadily increasing in volume, even though urea is improving its share of the business. The sale of bottles in 1950 was 2.16 times that of 1935 and seems to be still growing. In 1951 there were 5638 million bottles produced for liquor, wine, medicine, and toilet use. If all had plastic closures at 5.5 grams per unit the total plastic compound required would be

(*Continued on p. 164*)

Plastics Production In Commercial Closures

	Units[1]	*Lb. of Plastics*
1946	2,569,367	n.a.[2]
1947	2,230,166	n.a.
1948	1,996,787	20,400,000
1949	1,951,992	19,300,000
1950	2,569,923	24,600,000
1951[3]	2,850,886	27,000,000

[1]Excluding closures for collapsible tubes
[2]Not available
[3]There was no breakdown between thermosetting and thermoplastic resins until 1951. In that year the thermosetting total was almost 25 million lb. and the thermoplastic total was a little over 1.1 million pounds. In the first nine months of 1952, the closure industry had consumed approximately 15 million lb. of plastics, of which less than a million was thermoplastic, and the balance thermosetting.

UREA and melamine resins continue to be a source of interesting speculation in the plastics materials family even though they may not pass through such radical periods of ups and downs as some of the other resins.

During the past year MODERN PLASTICS magazine has probably received more inquiries from research agencies concerning the state of urea plastics and their future possibilities than about any other plastic except polyethylene. We are at a loss to give a definite reason for this interest unless it is based on a combination of the following circumstances:

1) Considerably more crystal urea is now available and still more production has been planned. More profit can be made by selling the crystal for plastics than for fertilizer. Formaldehyde producers too have planned huge production increases and are intensely interested in the future growth of urea formaldehyde resins.

2) Basic patents for urea molding material expire shortly.

3) Lower cost processes for producing urea and melamine resin may possibly be in the development stage.

4) Manufacturers like its hardness, fire proofness, outstanding electrical properties, and its brilliant colors.

The possibility of lower cost urea and melamine molding materials seems to stem largely from reports that melamine can be produced directly from urea crystal. Another straw in the wind is that urea and formaldehyde is now a less costly raw material base than phenol and formaldehyde.

Margin of Price

Urea and melamine producers, however, are not making any promises or predictions concerning these prognostications made by market researchers. In the case of melamine, they point out that the price of molding powder has never advanced and the margin of price difference between melamine and competitive plastics is constantly becoming smaller since other materials have generally increased. In the case of urea they point out that the pre-war price difference of 15 cents a lb. between urea and phenolic has materially lessened—that urea is not showing much growth at the present price level and consequently any price trend is likely to be down rather than up.

During 1952, melamine molded dishware continued to make advances and was a nice comfortable item to have in compression molders' shops during the first half of 1952 when other business was slack. Dishware accounts for an estimated 85 or 90% of melamine molding material and is expected to consume about 25% more material in 1953 than in 1952.

Molded Melamine

The melamine molding material market seems to be developing strongly along the same lines as ceramics. In addition to dishware, for example, melamine is becoming a prime material for jars used in soda fountains and for many of the electrical parts formerly constructed of ceramics. One big advantage is that melamine can be molded to closer tolerances.

In electrical parts, asbestos-filled melamine has become particularly adaptable because of its 300° F. temperature resistance. In specialty jobs it will go up to 400°. This type melamine has also been vastly improved in the matter of age-shrinking, which had been a cause for complaint in earlier days. Principal

uses are in distributor heads; watt hour meters; connectors; terminal strips; parts for ignition harnesses; and radar and fire-control components.

Melamine buttons, because of color fastness, mechanical strength, and resistance to cleaning fluids are also on the increase and are specified by the Marine Corps and Army Quartermaster for wash type garments. Most men's shirts are now equipped with either melamine or ocean pearl buttons with the melamine portion of the field constantly increasing.

In 1952 the Quartermaster procured 6,697,700 shirts on which were 66,977,000 melamine buttons. At 2.3 lb. of melamine per great gross (1728), that would require about 90,000 lb. of melamine. Not a great quantity of melamine compared to total production, but many other articles of apparel are also furnished with melamine buttons and many of them are much larger than shirt buttons.

An interesting new material looking for applications is an experimental highly translucent melamine molding powder which is scratch resistant and is static-free. It sells in the acrylic price bracket.

Laminates

Melamine volume for decorative laminates increased slightly in 1952 over 1951 due to a better situation in furniture sales during the year and an increasingly wide base for furniture applications. However, such a small amount of melamine is required per unit that not too much effect on total volume is shown.

Melamine-glass laminates made no particular progress in 1952. They have not yet been widely adopted except for military and specialty uses.

A low pressure melamine resin that gives both arc and impact resistance in one material is still experimental.

The total melamine and urea molding powder and laminating resin sales held between 4 and 5 million lb. a month from January through July with August sales at 5.3 million pounds. The last four months were expected to show a reasonable but not sensational increase. The total for the year may possibly reach close to 60 million lb., provided December sales hold up; somewhere near 40 million lb. of this would be urea.

Capacity

Capacity for both melamine and urea molding material (with interchangeable equipment) is estimated to be more than 80 million lb. annually and could probably be easily increased by making a few alterations. Certificates of Necessity have been granted for new plants but there have been no published details on how much volume will be added to the industry nor how soon.

Perhaps the most interesting item of all the news about urea molding powder last year was that which concerned an 18¾¢ electrical grade brown and black urea. Production problems, the same kind that generally confront any new plastics operation, were a handicap but all these problems seem solved at this writing. This material could really get its baptism in 1953 and prove whether or not it is going to be a big volume item. It is now being used in circuit breakers that replace fuse boxes in homes; these are undergoing what thus far seem to be favorable use tests. Other electrical parts, buttons, and closures can be molded from this material.

Major Outlets

Moldings for closures, buttons, wiring devices, and stove hardware are still the major outlets for standard ureas. Because of their color possibilities, urea closures have been taking more and more of the thermosetting closure business. One producer even expects urea to get a portion of the liquor bottle closure business which has been in other materials until now. A pertinent comment on urea closures was made by a producer who pointed out that white urea caps moved into a standard line of glass bottle and dark

(*Continued on p. 174*)

Table C—Urea and Melamine Resins Sales in Pounds [a]

	First 8 mo. 1952	*Estimated last 4 mo.*	*Total 1952*	*Total 1951*	*Total 1950*
Adhesive resins	47,900,000	28,000,000	75,900,000	75,100,000	85,600,000
Textile treating	20,300,000	15,000,000	35,300,000	29,400,000	
Paper treating	13,400,000	8,000,000	21,400,000	17,800,000	28,000,000[b]
Molding, laminating[c] and miscellaneous	37,300,000	24,000,000	61,300,000	74,500,000	70,700,000
TOTAL			193,900,000	196,800,000	184,300,000

[a] Source for 1950, 1951, and first eight months 1952: U. S. Tariff Commission. Last four months estimated.
[b] Combined total of paper and textile treatment only figure available for 1950.
[c] Does not include surface coating resins. Includes filler for molding material. Melamine material for molding, laminating, and miscellaneous uses is estimated to be between 16 and 19 million lb. of the total for 1952. Urea sand core resins and other miscellaneous are estimated to be under one million pounds.

BOTH joy and pain reigned in the vinyl kingdom in 1952. The sheet processors, fabric coaters, and wire coaters—especially the latter—showed improvement over 1951 but the film industry suffered because of the inability to digest the vagaries of a confused price structure.

All vinyls—including acetate, alcohol, butyral, formal, and saran—will probably show a total sales volume for 1952 of around 400 million lb. of resin in comparison to 388 million lb. in 1951, according to U. S. Tariff Commission figures. There are critics who believe the Commission figures are somewhat high due to

small duplications in company reporting as in polyvinyl alcohol and acetate.

However, the subject is so complex that no effort will be made here to separate all the various materials in the Government's over-all figures on vinyl. This report will deal only with vinyl chloride and copolymers, or about 80% of total vinyl resin production.

Table D was compiled with the help of various raw material companies which keep exceptionally good records on where and how their resins are used.

Much depends, of course, upon the accuracy of our estimates for the last four months of 1952. The industry took a big jump forward in August, with sales comparable to most of the best months in 1951. A flourishing business in sales of resin for wire coating throughout the year is probably the chief factor that resulted in an increase of over-all vinyl sales for the year. Actual production of resin in 1952 was probably less than in 1951 since producers built up large inventories in the last quarter of 1951.

It will be noted that the figures in Table D for 1951 sales have been revised downward. Scarcely anyone foresaw the extent of the decline when estimates were made in September of that year. Consequently, our over-all figure of resin sales in 1951 was at least 10 million lb. too high. We may have erred again this year, and although sales managers were much more cautious in 1952 than in 1951, the upward trend in August and September indicated that our estimate for the last quarter may be low instead of high. In other words, there will be no surprise if resin sales exceed the 341 million lb. total for 1952, as shown in Table D.

Productive Capacity

It is believed that production capacity for polyvinyl chloride and copolymer resins by the end of 1952 will be somewhere between 460 and 485 million pounds. By the end of 1953 or early 1954, total capacity may reach 575 million pounds. If everyone who has applied for a Certificate of Necessity from the Government goes through with his plans, it is possible that total production capacity may reach close to 700 million lb. some time in 1955; but there is great doubt that all those plans will be consummated. Much depends upon how far the market for vinyl expands in the next year or two and whether or not the world assumes a more or a less belligerent attitude.

It is one man's guess that we are more likely to get the increased volume only if the world assumes the more belligerent attitude. Some people expect the industry to reach a one billion lb. figure by 1960, but our more reliable sources indicate this is pure speculation.

Over the next two or three years, the industry must have time to consolidate its gains and put its house in order. It will take time to ascertain the effect on the industry of the smaller producers which are now expanding and whether or not their efforts will be confined to an attempt to cut into the present volume of two major producers or to broaden the base of the industry. All existing vinyl markets can be counted on to show a gradual increase, but probably not enough to account for presently planned capacity.

Present Boundaries

The industry is now looking beyond its present boundaries and is especially hopeful that expanded and new markets for floor coverings, plastisols and organosols, rigid vinyls, and surface coatings will continue to make it possible for the vinyl industry to continue the same rapid rate of increase it has shown since 1946. Probably several years will have to elapse before it can be determined whether or not these big, new fields are to open up on the

Synthetic Resin Sales for Surface Coating Materials Used in 1951 and First 8 Months of 1952*

	1951	*First 8 Mo. 1952*
Phenolics	46,000,000	15,500,000
Urea and melamine	17,500,000	11,200,000
Styrene	48,000,000	44,400,000
Vinyls	21,700,000	12,800,000
Alkyds[1]	440,600,000	143,700,000
Rosin modifications	67,200,000	12,100,000
Miscellaneous[2]	21,200,000	15,800,000
	662,200,000	

* Source: U. S. Tariff Commission.
[1] Production figures are used for alkyds rather than sales figures since many paint manufacturers produce and use their own resins.
[2] Figures for coumarone-indene, petroleum resins, nitrocellulose, and ethyl cellulose materials are *not* included in this summary.

The above table is given here to give the reader an idea of the tremendous amount of synthetic resins used in the paint, varnish, and lacquer industry. These figures are frequently included as part of the plastics industry total and added to the totals which are listed in Table A on page 56. MODERN PLASTICS' policy, however, is to regard the so-called "paint" industry as an entirely separate industry just as is the textile industry which also uses thousands of pounds of synthetic materials, such as acrylonitrile, nylon, acetate flake, and zein.

The reader will note that the first eight months for 1952 have not been totaled. There are several reasons: The first is that several paint resin producers do not report to the Tariff Commission on a monthly basis—their sales figures will therefore not become available until the end of the year when they make their annual report. The second is that estimates for the last four months are not readily available. Producers do tell us, however, that total synthetic materials for the paint, varnish, and lacquer industry in 1952 will be approximately the same or perhaps a little more than in the year 1951.

grand scale expected in some quarters.

In the meantime, management may have some scares and worries over whether or not capacity is too big for the markets, but they will never admit it in public. The vinyl vision is forward and upward. Talk of any limit on expansion possibilities is strictly verboten in the trade.

However, there is one section of the industry where critics try to maintain that a saturation point has been reached. That section is calendered film which boomed from a consumption of 54 million lb. in 1949 to 81 million in 1950, but has shown little or no increase since. In fact, some of our informants insist that sales went down a mite in 1952; others insist that sales were a mite over 1951. All agree that if there was an increase it was very small.

The pessimism was mostly existent in mid-year. It is believed that sales for the last half were high enough to bring the year's total up to around the same as 1951 insofar as sales were concerned.

The average thickness of film has increased slightly since it was found that 2 mil film was unsatisfactory. Most run-of-the-mine material is now about 3 mils, although high quality goods is still 4 mils. It is also probable that there is more 6-mil film in production than previously since shower curtain stock has been largely increased from 2 or 4 mils to 6 mils in order to give better styling. The same trend on a smaller scale is noticeable for table covers. According to producers, the apron market declined due to attempts to use super-thin film. Cottage curtains went off during the year because fabric became available at lower prices and in more variety.

Calendered Film Price

The calendered film industry has been described as a sick industry, not because volume has fallen away, but because of its price structure. During 1952, film could be obtained at prices ranging all the way from 48 to 67¢ a lb., depending upon the quantity ordered. The 48¢ stuff generally contained filler, but there was a plentitude of 52¢ material on the market at all times. Since vinyl compound costs about 42¢ a lb. for reasonable quality, when yield is considered, there isn't much margin left to account for overhead, depreciation, and selling costs in a 52¢ selling price.

Many film producers seem to feel that the only way to market their goods is on a price basis. When the market is slow, they start cutting prices. The middle-of-the-road producer gets hurt the worst in this melee. The ultra-low-cost man generally sells a low grade product, anyhow, and his costs are low. The premium-grade operator maintains a high level cost because he has found customers who will pay a premium price for quality goods. Some of them have even refused to operate their calenders rather than sell below their standard price.

The middle-of-the-roader has lost out on the premium field, cannot meet competition from the ultra-low-cost producer without degrading his product, and starts reducing his price a little at a time until he is caught in a vicious and profitless price war. This horrible situation is likely to continue to haunt the industry until quality standards are set up and agreeable and legitimate trade practices are instituted. Some film producers have struggled mightily to force down the price of resin as a panacea for their ills. But even if such a course were followed by resin producers, it would only result in the same film price bickering at a reduced level.

Everything was fine when resin and film were scarce and calenders hummed along merrily seven days a week; but when demand fell off and film producers turned to price cutting as their method of merchandising, the cat was in the stew. On top of this chaotic condition, the calendering industry has built up a huge production plant that could probably produce 30 to 40% more goods than present yearly demand without adding a single new piece of equipment. Until problems of price and quality are adjusted, there can be no peace and probably very little increase in the calendered film market.

Extruded Thin Film

There is the usual amount of talk about extruded thin vinyl film in the industry, but little indication of sizeable production. Some experimenters claim that extruded film can be processed at higher temperatures and thus better properties can be obtained. The possibility of lower capital investment is also being studied. It has been asserted that a one-mil extruded film would be ideal for utilitarian use in the home, especially for use in deep-freeze wrapping. An extruded nitrile rub-

Table D—Vinyl Chloride and Copolymer Consumption in Pounds, 1950-1952

	1950		1951		1952	
	Resin	*Compound with filler*	*Resin*	*Compound with filler*	*Resin*	*Compound with filler*
Film under 10 mils	81,000,000	130,000,000	81,000,000	130,000,000	80,000,000	127,000,000
Sheeting over 10 mils	64,000,000	119,000,000	67,000,000	121,000,000	74,000,000	148,000,000
Fabric coating	35,000,000	75,000,000	35,000,000	80,000,000	38,000,000	86,000,000
Paper treatment	7,500,000	11,500,000	8,000,000	12,000,000	9,000,000	14,000,000
Molding, extrusion	68,000,000	130,000,000	90,000,000	164,000,000	105,000,000	200,000,000
All other, including exports, coatings, and so forth	35,000,000	48,000,000	42,000,000	56,000,000	35,000,000	58,000,000
TOTAL	290,500,000	513,500,000	323,000,000	563,000,000	341,000,000	633,000,000

ber plasticized film is now making headway as a meat and cheese packaging material. Other experimenters who have been at this extruded film business for years maintain that its progress is still no more than developmental and that one of the big problems yet to be worked out is its cost in comparison to other types of film.

Cast Film

Cast film of rare quality has been produced in fair quantity for some time, but at a premium price. When someone comes along who can produce it at a faster rate than by present methods, which are handicapped by slow oven speeds, the results may be startlingly good. A great deal of attention is being given to developments along this line and such a method may blossom forth any day.

Among the interesting cast films widely advertised last fall were 2- to 5-mil solvent cast films for storm windows. Their chiefly advertised properties are clarity, strength, and weather resistance.

Vinyl Sheeting

Producers of sheet more than 10 mil thick fared much better than film producers in 1952 insofar as volume and profits were concerned. The figure for sheeting given in Table D includes sheet produced for floor covering. Since there was a considerable increase in this material for 1952, the percentage of resin used per pound of compound has been considerably reduced under other years as is shown in Table D. The reason is that floor coverings are loaded more heavily than upholstery materials.

Sheet used for upholstery and kindred purposes increased 14% for the first nine months of 1952 compared to 1951, according to the Plastics Coatings and Film Association. (See Table E.) It probably increased considerably more in the last three months. The expansion is accounted for by increased furniture production and the use of vinyl sheet for upholstery on more different types of furniture, especially outdoor varieties. Close to 60 million yd. of vinyl sheet or coated fabric went into upholstery uses in 1952, according to the Association, and a 10% increase is expected for 1953.

Most of the inflatables use material in the sheet classification; only small items, such as toys, use 8-mil film. The rest of production runs from 12 to 20 mils. Air mattresses use 20 mil sheet. Although of comfortable proportion, production of inflatable sheet is held back because of manufacturing difficulties in producing pin-hole free material which is heat-sealable. For such applications there must not be the slightest variation in thickness to interfere with electronic heat sealing. Among the unusual inflatable items that showed considerable volume growth in 1952 were fishing waders.

Table E—Comparative Shipment Figures of Vinyl Sheet and Coated Fabric for First Nine Months of 1952 and 1951*

	First 9 Months 1952	*First 9 Months 1951*
PLASTIC-COATED MATERIALS, linear yards		
Light weight (10 oz. and under)	3,080,468	3,648,374
Heavy weight (over 10 oz.)	27,781,342	24,823,175
Custom coated	1,528,206	1,621,311
TOTAL	32,390,016	30,092,860
ALL-PLASTIC SHEETING, square yards		
10 to 15 mils inclusive	26,243,752	24,117,412
16 to 19 mils inclusive	2,281,157	964,702
20 mils and over	14,199,360	12,096,405
TOTAL	42,724,269	37,178,519

* Represents about 80% of sheet industry and 60% of coated fabric industry in yardage. Compiled by the Plastics Coatings and Film Association in collaboration with the Rubber Manufacturers Association, Inc.

Floor Coverings

Biggest dent made by vinyls in any field last year was in floor coverings; from here on, this application is expected to increase to a point where floor coverings will be a foremost user of vinyl resin. Authorities vary on the amount of resin used thus far. Estimates range from 11½ to 14 million or more lb. in 1952 in comparison to from 8 to 10 million lb. in 1951. It should be 50 million in 1955. This recent growth is not nearly as significant as the fact that manufacturers have finally learned how to use vinyl in floor coverings without too much worry over shrinkage or adhesion.

From here on, the growth of vinyl floor coverings should be much more rapid. A straw in the wind was the entrance into the field of one of the largest producers of floor coverings who held out against vinyl until he was certain he had the right answers. Another stated: "It is certain that never again will any producer ever build a standard linseed-oil type floor covering factory."

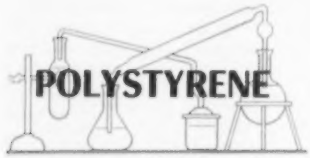
There are several outstanding points now discernible in floor covering developments. For example, a vinyl-asbestos combination, although in the same high cost category as rubber tile, licks at one fell swoop the problems of shrinkage and adhesion that customers have complained about in solid vinyl tile. In the case of vinyl-asbestos, price is considered no great handicap since the new tile can be laid by amateurs; any ordinary cement can be used; and the material is extremely easy to handle. There are no breakage problems such as with asphalt tile. Furthermore, the vinyl-asbestos tile can be used below grade on a basement floor with little danger of damage from moisture.

Vinyl flooring that competes with linoleum types has a vinyl sheet laminated to an asphalted felt base. This material also made the headlines during 1952 and is still favored to be a leader in vinyl-consuming floor coverings. A new process for laminating vinyl to a resin-treated paper base may also contribute to a lower cost bracket for this type of flooring.

Solid vinyl floorings and paper with a vinyl surface coating laminated to a felt base continued to keep their place in the market. A

newer development is the experiment now going on to use a plastisol instead of linseed oil in the low cost enamel-coated felt base materials that make up the largest field in the whole category of floor coverings.

(*Continued on p. 176*)



PRODUCERS of styrene resins had no worries about benzene, styrene monomer, rubber allocations, and military applications during the first half of 1952. But they had a bigger worry: what had happened to their customers? The customers weren't buying enough resin. From a 22 million lb. average month for sales in 1950 and 1951, volume had dropped to 16, 17, and 18 million lb. months in the period from January to June 1952.

Apparently the molders weren't so bad off. They had laid in big supplies and were fairly busy, if their dollars tell a true story. Molders' sales were off only 8% compared to a 13% drop in sale of molding material.

Then things began to happen fast. Sales of styrene resin jumped from a low of 16.4 million lb. in July to 20.5 million lb. in August. September was predicted as sensational. A forecast of 26, 28, or perhaps even 30 million lb. months was made for October and November, with not too severe a drop expected in December. Producers suddenly exhausted their own inventory and one company was even reported as running short because additional facilities couldn't be placed in operation fast enough. It is reported that this manufacturer's facilities are now booked solid through March. Most encouraging, too, was the news that the increases came in every type of end product, with toys and housewares leading the parade. Refrigeration parts came back fairly strong but the big impact from that source was not expected until refrigerator manufacturers begin to replace the big inventories that dealers have been holding.

With this encouraging spurt, styrene producers are now expecting a 20% increase in 1953. The big pieces counted on to bolster the industry have not yet come through in any great quantity but development work has been constantly under way and surely some applications of large moldings will begin to pop up their heads before 1953 has gone into history. If the industry expects to achieve its goal of from one half to three quarters of a billion pound production in late 1955 (or around 60 million lb. a month), some of these big items will just have to develop.

It is interesting to note, too, that a great portion of the increasing business is in straight styrene resins. The modified or alloy styrenes are estimated at no more than 4 or 5 million lb. a month but are expected to show large volume increase in 1953. Not long ago a big whoop and holler was raised about boilable styrene, tough and break resistant, etc., but it has been found that molders dislike the stuff because it is difficult to mold. In addition, customers aren't too particular about whether or not the material can be boiled because they don't expect to use it for cooking purposes anyhow. About the highest heat it must withstand in a kitchen is when it is going through a dishwasher.

One of the styrene resin variations that does seem to have taken hold, however, is a medium impact material which sells for only a cent more than standard. It is what might be called a "cut" high impact material or a blend of standard and high impact compound. When a molded piece is bent it takes a permanent set but in the final analysis the material is an upgraded standard polystyrene with enough elongation to measurably improve its impact strength.

Of course, this doesn't mean that alloys won't be useful but it looks now as though what the average molder wants most is plain, crystal polystyrene. It runs through his machines like lightning, is low in cost, and pleases his customer.

Coloring Styrene

Estimators state that molders are now coloring about 40% of their styrene molding material in their own plants and thus saving on material costs. Polystyrene is unquestionably a low cost material and molders will take every advantage they can to capitalize on that feature.

Another rather odd development is that most of the molders who are expanding their facilities are in the East. The West Coast molders who played such a large part in putting housewares on the market in huge volume a few years ago appear to be lackadaisical about expansion. Apparently they are content to stay as they are and not worry about getting big.

Among the outstanding applications in 1952 should be mentioned the widespread adoption of molded styrene Edison battery cases to replace glass. This use is really not new; it was worked on for aircraft during the war but 1952 marked its evolution as standard equipment. One styrene-cased automobile battery was announced in 1952 and it

Table F—Styrene Resin Sales In Pounds [a, b]

	First 8 mo. 1952	*Estimated last 4 mo.*	*Total 1952*	*Total 1951*	*Total 1950*
Molding materials[c]	137,000,000	104,000,000	241,000,000	245,000,000	268,000,000
Resins for other uses exclusive of protective coatings[d]	38,300,000	24,700,000	63,000,000	63,000,000	64,000,000
TOTAL			304,000,000	308,000,000	332,000,000

[a] Source for 1950, 1951 and first eight months 1952: U. S. Tariff Commission; last four months 1952 estimated.
[b] Includes plasticizers, fillers, and extenders for molding powder only.
[c] Includes copolymer molding materials with styrene base.
[d] Includes high styrene-butadiene resins, polyesters based on styrene, ion exchange resins, metal treating resins, and miscellaneous, except protective coatings.

is expected that more will soon follow, not as occasional practice, but in large volume.

Packaging is another field where polystyrene is beginning to get a more definite foothold. So far the material has served chiefly for producing re-use packages for cheese and a few other items. These containers are designed so that after they are emptied they may be used as flower pots, refrigerator boxes, knick-knack receptacles, or any one of many household purposes. On the West Coast, polystyrene boxes are being used as containers for the new type synthetic ice cream. The product costs some 50% less than standard ice cream and the fancy box is

(*Continued on p.* 179)

CELLULOSICS

FIRST of the thermoplastics to really start moving through injection machines and extruders way back in the 1930's, cellulose acetate has had to give way from a volume standpoint to other and lower-priced materials. Paradoxically enough, acetate was based at that time on two of the lowest cost materials in industry—alcohol and cotton linters. But times have changed and the cost of raw materials for cellulosics has at times soared to almost unbelievable heights.

During the last year, there was some evidence of a growing change in this basic situation, but not enough to create an upward trend in cellulosic production. For example, the price of benzene, from which other thermoplastics are derived, has increased from a low of 17¢ a few years ago to prices ranging from over 30¢ to more than 50¢, depending on whether it was derived from coal tar or petroleum, or imported. Ethylene, another raw material from which thermoplastics are derived and which has been almost a waste product for generations, is now in such demand that it, too, may be expected to rise in price as demand goes up. Alcohol dropped back into the 20 to 40¢ range after a peak of three times that much, but is still higher than pre-war. Cotton linters are back again under 5¢, but their significance in cellulosics is disappearing. Less than ⅛ of cellulose acetate molding powder today is based on linters—they are not even essential for packaging film. A high grade of lower cost wood cellulose is now apparently satisfactory for all but very special grades of transparent cellulose acetate, and flake is available at prices ranging from 43 to 48¢ a pound.

Prices of acetate molding powder now range from 50 to 59¢ for the transparent Group I class; 46¢ for the pigmented Group II class; and Group III, which is available in a limited color range, sells for 42 cents. There are various types of acetate in this limited color range that sell from 35 to 49 cents.

It is obvious that the cost of acetate is still higher than other thermoplastics, especially when considering specific gravity; but the margin has been narrowed, especially in colored material.

Acetate has had a rough time with its supply line since 1941. The worm might turn with an abundance of low cost alcohol derived from petroleum and plentiful supplies of wood pulp in the future.

The dark spots in that hopeful picture, however, are that cellulosics will probably never have as broad a base of application as other large volume thermoplastics despite their excellence for such things as toys and appliances where toughness is a requirement. Furthermore, despite the rising costs of benzene and ethylene, it is possible that both styrene monomer and polyethylene will eventually decline in price due to increased volume.

The odds are that there will be very little expansion in cellulose acetate molding material production capacity beyond the present estimated figure of 8 million lb. a month until there is more certainty of future markets.

Butyrate

Insofar as cellulose acetate butyrate is concerned, the sole producer has made no announcement of any plans for the future. Automotive parts, such as steering wheels, communications parts like telephone hand sets, tool handles, and pipe led the pack. Pipe has not gone ahead with the rush expected after a most promising start, but it remains a leader in the butyrate business—adoption in the oil fields where

Table G—Cellulose Plastics Sales in Pounds [a, b]

	First 8 mo. 1952	*Estimated last 4 mo.*	*Total 1952*	*Total 1951*	*Total 1950*
Cellulose acetate and cellulose acetate butyrate sheets:					
under 0.003 gage	6,600,000	4,600,000	11,200,000	15,100,000	12,200,000
0.003 gage and over	5,700,000	4,000,000	9,700,000	10,400,000	11,000,000
All other sheets, rods, tubes	3,400,000	1,800,000	5,200,000	5,200,000	4,300,000
Molding and extrusion materials	34,800,000	23,000,000	57,800,000	62,200,000	80,000,000
TOTAL			83,900,000	92,900,000	107,500,000
Nitrocellulose:					
Sheets	3,000,000	1,900,000	4,900,000	5,600,000	6,200,000
Rods and Tubes	640,000	360,000	1,000,000	1,200,000	1,200,000
TOTAL			5,900,000	6,800,000	7,400,000
Other cellulose plastics, primarily ethyl cellulose and Valite	4,400,000	2,100,000	6,500,000	10,700,000	12,600,000

[a] Source for 1950, 1951, and first eight months 1952: U. S. Tariff Commission; last four months 1952 estimated.
[b] Includes plasticizers, fillers, and extenders.

butyrate was thought to be a natural for pumping brine back into the earth has not been as rapid as anticipated. Workmen are hesitant to adopt new materials and claim that they already have so many different types and sizes of metal pipe in stock that they do not want any more. That is, of course, only one of several problems, but it is just one more type of trouble confronting widespread adoption of plastic pipe even though it is a 10 to 1 bet that plastics pipe of all sorts will be installed in thousands of feet for hundreds of applications within ten years' time.

Acetate and butyrate molding powder sales were from 4 to 5 million lb. a month during the first eight months with a surprisingly small amount of fluctuation. Sales shot up remarkably well in September to follow the general trend of all plastics. Up until then, April had been the highest month with a 5 million lb. sales figure. The record month was October 1950—8.5 million pounds. The record year was 1946—83 million pounds.

Film Figures

Cellulose acetate film from under 0.003 gage to 7 or 8 mils thick had a better year than some of the other plastics, with thin extruded dry film leading; but producers were hopeful that it would be better. Film under 0.003 gage has a theoretical market of over 1 million lb. a month but it failed to reach that goal in any month from February through August. From July 1950 through October 1951, sales never dropped under 1 million lb. and in July 1951 reached a total of 1.6 million pounds.

The thinnest film is used for packaging wraps; for laminating both packaging and glazing materials; for second recording; and for pressure-sensitive and electrical tape. Over 0.003-in. film is used largely for metallizing as decorative material; set-up boxes; formed containers; and glazing. Storm windows are from 0.003 to 0.004 gage.

Thick film or so-called sheet is used for lamp shades, packaging, decorations, sequins, and military purposes. A military demand of considerable size for 7- or 8- mil film has developed over the last year that could become extremely large in war-time and may supersede a previous job that was intended for molded and extruded acetate.

A growing new use is acetate film as a separator sheet in polyester-glass laminating jobs. Processors like it because it gives a crinkled rather than a high gloss surface. One polyester-glass laminator is using acetate as a separator in equipment that turns out continuous laminates which are 12 ft. wide and 500 ft. long.

(*Continued on p.* 181)

THE "Wonder Boy" of the plastics industry continues to be a "Wonder." When new increments of polyethylene started to come in last April and May, the supply situation improved so much that the material was taken off government allocation in August.

But it didn't take long for the supply line to get bogged down. In September, polyethylene had again been placed on allocation, but this time by the producers. They were faced with more demand than they could supply and were forced to allocate to their customers so that all could be treated fairly. Both military and civilian requests piled up in every category. There was no particular new end use of any quantity involved in this upsurge. The increases simply involved more polyethylene for the same type of products that were already familiar to the trade. Distribution today is a little less than 30% of production to the military compared to over 40% in early 1951. Total use is divided into about one third for electrical uses; a little over one third to film, and the balance to "all other."

Production for the year 1952 will probably be in the neighborhood of 105 million lb. in comparison with about 85 million lb. in 1951, and a little less than 50 million lb. in 1950. Capacity for polyethylene production at the end of 1952 is estimated to be about 10.5 million lb. a month. By the end of 1953, capacity should be about 19 million lb. a month or around 230 million lb. a year if present plans are carried out.

In 1954, Bakelite is expected to add another 100 million lb. of capacity and Tennessee Eastman may be ready with its plant which, it has been estimated, will be in the 20 or 25 million lb. range. That would make a total of 30 million lb. a month available in 1955. However, Du Pont has not announced its plans for the future. Rumors attach the Du Pont name to another 75 million lb. expansion which might be under way in 1954; if that rumor is correct, total production capacity would be eventually about 36 million lb. a month or 430 million lb. a year.

In addition to these fairly well known factors, many other companies are planning to jump into the pool, but it is doubtful that any of them will be ready to produce by 1955, if then, except possibly two or three petroleum companies who have already done considerable experimental work. Solvay, too, has done some work on low molecular weight material but has made no announcement concerning its plans for high molecular weight material. Several combinations of chemical and petroleum companies now in existence, and others not yet announced, are also said to be planning production capacity for both ethylene and polyethylene but it is difficult to foresee production from such sources before 1955.

It has been reported that more than 20 companies have applied for licenses to make polyethylene. Effervescent prognosticators assert that polyethylene film poundage will one day exceed cellophane production and that polyethylene is destined to become the first billion-pound plastic in history. However, potential new producers are wary —it looks "so-o-o wonderful," but they know that production of polyethylene requires unusual technical know-how; that present producers have taken and expect to keep the advantage of a big head start; that there are certain properties of polyethylene such as low heat resistance and certain types of permeability which prevent it from becoming an all-purpose material; that the potential market may be more limited than enthusiastic market researchers have learned; and that a huge capital investment is required.

An interesting sidelight on polyethylene expansion is that at least two companies are studying the possibilities of producing hydrogenated butadiene which has many similar properties to polyethylene and reportedly would produce a more transparent thin film. However, the multi-stage process required would supposedly be even more costly than that for polyethylene. Furthermore, polyethylene producers are thought to be already well along in their efforts to make a transparent polyethylene film.

Modified Materials

Modified or altered polyethylenes are already on the market. Du Pont, which has reportedly abandoned its attempts to produce a chlorinated polyethylene film that would have clarity and flame resistance, has resorted to chlorosulfonation to produce a product known as Hypalon S2 which is now being made in pilot plant quantities.

The new Du Pont product, which is described as a synthetic rubber, is particularly important because it resists ozone, a deadly enemy of most other rubbers since it induces aging or cracking when the rubber is exposed to air for long periods. Where a 75-25% blend of tire rubber and Hypalon is used, the tires will resist ageing for a much longer period. Such blended rubbers could be used on parts for farm machinery which must be stored outdoors; for door and window stripping in airplanes and autos; conveyor belts; wire covering; engine mounts; unsupported hose; and many types of mechanical rubber products.

Rulan is another Du Pont polyethylene-type product into which has been built flame retardance. So little material has been available for this project that it has not yet been promoted to its full possibilities.

Electrical insulation still takes almost one third of polyethylene production despite the increased poundage made available in 1952. However, the Army takes a great portion of this amount for its assault wire and Spiral-4 programs. The Navy also uses good sized quantities for shipboard use and submarine cables. Civilian uses are about the same as they have been for several years—coaxial cable separators, television lead-in wire, Alpeth telephone cable, and line wire. Pressure sensitive, adhesive coated, calendered, electrical tape will take large quantities of polyethylene before long. This same type of tape is soon expected to become a household item and is also being used to wrap underground soil pipe as an anti-corrosive protection.

Extrusions

Profile extruded polyethylene is today used primarily for gasketing, belting for such things as watch bands and camera handles, and small diameter tubing that is used for medical and scores of other purposes.

Extruded pipe has become a leading outlet for polyethylene. In mines it has taken a good share of the market because of its anti-corrosive properties. Water pipe for jet wells; for house-to-main connections, as in Levittown, Pa.; and for water distribution on the farm are other applications. Radiant heating pipes and pipes for wire conduits have been installed. Claims have been made that over 6 million lb. had been used for pipe up to the middle of 1952.

There are lots of problems involved in this pipe business and volume may move backward and forward by fits and starts until the troubles are straightened out and trial tests proved up. But producers feel confident that pipe is a market which will eventually consume a good percentage of total production.

Film

Extruded film is the fastest growing polyethylene product today and is likely to continue that way for some time to come. In April 1951, film was produced at a rate of about 25 million lb. a year. In November it jumped to an estimated rate of 40 million pounds. Total production for the year was estimated at around 30 million lb.—possibly a little more, depending upon fourth quarter demands.

Chief use for polyethylene film is packaging. A tremendous and increasing field is in drum liners, where the chemical resistance and low water vapor permeability of polyethylene make it ideal for packaging hygroscopic materials. This wvp property plus low temperature resistance mark the film as an outstanding frozen food packaging material at either the home or packing-house level.

Big as the packaging market is today, there has hardly ever been enough polyethylene to satisfy demand. It should grow much larger. Nearly all packaged products are likely users of this film in the future. Bakery goods, dried foods, hardware—especially where rust is a problem—are already in the fold and getting bigger. Bulk candy will stay fresh three times as long when wrapped in polyethylene. "If it can be wrapped, it can be wrapped in polyethylene," could become the slogan of the industry.

Some packaging markets were lost when polethylene became scarce and the industry will have to work to get them back, but success is inevitable. Whole steer and lamb carcasses were once wrapped with polyethylene. The market was lost because of scarcity of material and clumsy sealing processes. With the perfection of heat sealing methods, the market should be regained.

There seems no question but that polyethylene producers are counting on increased food packaging needs to absorb a large part of their planned new production. But film will also have many other uses, such as linings of all types where corrosion or moisture are problems. Large quantities will be used for television and radio parts and perhaps under floors to prevent moisture from coming through.

Producers have more or less discouraged the use of polyethylene film for apparel or house furnishings such as window drapes or aprons because of unsatisfactory

(Continued on p. 183)

MOST satisfactory to the acrylic industry has been the advancement made in molded parts for automotive use. The industry had increased its volume by a considerable percentage both because more automobiles were using more acrylic medallions, buttons, tail lights, etc.,

and because the size of some of the pieces used was constantly increasing.

The trend continued in 1952 but the number of automobiles produced declined. Then the big interest in acrylics shifted to molded signs and lighting fixtures which are rapidly becoming much larger both in volume of material consumed and in size of each individual molding.

Extruded acrylic parts in larger sizes have also become a part of this over-all situation so that it becomes difficult to separate molding and extruding in any brief discussion. Acrylic lighting fixtures have been under development for some years, but they have received their big impetus since 1950. Probably 10 times more acrylic is now being used in fixtures than in 1949. Extruded fixtures are still predominant but molded pieces are coming along fast.

One new office building in New York City was recently equipped with 6000 acrylic fixtures. The practice is becoming more and more general, especially in the East, but the development is beginning to spread into other parts of the country in ever-increasing volume. It augurs well for the acrylic industry.

Ceiling Panels

Hand in hand with the lighting fixture business is the acrylic ceiling panel application which has also begun to click in most satisfactory fashion. The program is somewhat handicapped because of delays occasioned by the necessity for changing city building codes; the lighting fixture people have already jumped their worst hurdle which was getting Fire Underwriters' approval.

Complete luminous ceilings are now being marketed in one package. Ceiling panels and lighting fixtures are also expanding their markets from new buildings to renovation of old buildings where they can be used to cover up pipes and beams and help give an airy, cheerful atmosphere to former dingy quarters.

The largest acrylic injection molding ever made in this field was reported last year as a 12- by 48-in. injection molded lighting pan to use with fluorescent lighting. It was molded on a 100-oz. injection machine.

Fabricated fixtures and ceiling panels are from $\frac{1}{10}$ to $\frac{1}{2}$ in. thick and frequently about 4 ft. square. Pieces as large as 5 by 8 ft. have been shown.

The greatest volume of all in this lighting and ceiling family will probably be in extruded acrylic which can be less costly than cast or molded material. Continuing research in extrusion of larger pieces on a continuous basis is expected to contribute definite results to this expanding acrylic program in the near future. Heretofore most extruded lighting fixtures have been mostly short, semi-circular pieces. But now improved processes have been developed to extrude 12 to 18 in. wide flat and corrugated pieces continuously —even a 24 in. width has been reported.

When the bugs have been ironed out, this process should create quite a boost in acrylic applications. A $\frac{1}{16}$- or $\frac{1}{8}$-in. extruded sheet would be less costly than cast sheet of that same thickness. Cast sheet $\frac{1}{8}$ inch thick costs about $1.30 a lb.; extrusion powder from which sheet is extruded is only 65¢ a pound. Anything over $\frac{1}{8}$ in. thick would probably be less costly in cast sheet.

Greater Strength

Another possibility in extruded sheet is increased strength. If stretched both ways, extruded acrylic sheet might have a strength that would be even greater than cast sheet.

In the background of this expansion in lighting fixtures and ceiling panels is the continuous research going on to produce acrylics that will be flame and craze resistant and will possess higher heat distortion points. No one can tell just when improved materials of this sort can be expected but it wouldn't be surprising if at least one of these improvements was announced most any day.

The ceiling and lighting business may have been the more fascinating of acrylic developments in 1952 but signs, both molded and fabricated, took the largest share of acrylic volume for civilian use. There was a trend toward increase of molded signs as against fabricated pieces, but the fabricators haven't suffered. They are getting more of the large, outdoor type signs which are beyond the capacity of most injection machines.

A good example of another field where molders have moved in on fabricators is the big Snowcrop fruit juice dispenser which was originally fabricated from sheet.

Acrylic glazing for skylights, domes, army huts, and industrial buildings continues to grow in applications where glass breakage is a problem.

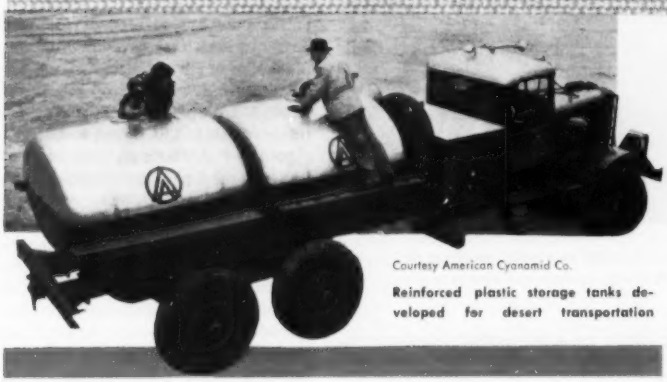
Approximately half of acrylic cast sheet production is going into the military aviation program where $\frac{1}{4}$ to $\frac{5}{16}$ in. thick sheet remains standard material for canopies and other glazing applications.

Production volume of acrylic in 1952 is estimated to have increased slightly over 1951. Du Pont has announced no plans for the future. Rohm and Haas has received Certificates of Necessity on projects totaling $15,000,000 that include additional facilities for raw materials, monomer, polymer, and cast sheet.

THE low cost, permanently thermoplastic materials in the coumarone indene and petroleum resins group are used almost exclusively in surface coatings or in floor coverings where they replace asphalt. In fact, they have almost become the "asphalt" in asphalt floorings. Estimators believe that well over 50% of these resins are used in floor coverings. In addition to surface coatings and floor coverings, other uses are in plasticizers for low temperature flexibility; adhesives; fly paper; ink; rubber reclaiming; waterproofing; and for curing cement.

One producer's coumarone production was cut last year because natural gas moved into the East and his raw material sources for coumarone, which came from artificial gas manufacture, were depleted. Nevertheless, combined production of coumarone indene and petroleum resins kept abreast of 1951 until August and then increased about 10% for the last four months. Perhaps the popularity and steadily increasing sales of so-called asphalt floor tile account for the tremendous growth made by these resins in the past three or four years.

Application Trends in 1952



Courtesy American Cyanamid Co.

Reinforced plastic storage tanks developed for desert transportation

FROM the standpoint of plastics applications, 1952 was the year of the "3 P's—Plentitude, Progress, and Promise." Despite the slump brought on by the high inventories of late '51, new and old application jobs came on with a rush during the middle part of the year. By August the production demand had nearly swamped the mold makers. Inventories dwindled. The expected sizable military orders failed to materialize, but the industry was stimulated into renewed activity on civilian applications.

The results were notable.

Plastics made substantial gains in those fields in which it had long been accepted and, at the same time, made successful inroads in a number of new fields.

Application possibilities in almost all the industries were expanded by developments in processing methods. In numerous instances, the use of the specialized services provided by the newer plastics was intensified. New materials were made available and finishing techniques were improved.

But above all, the year 1952 was a year of promise. As MODERN PLASTICS so aptly pointed out in its March issue, the eyes of the entire plastics industry were fixed on the future.

There were "bigger things to come" in plastics applications—and the trends of 1952 point the way, as recorded month-by-month in the pages of this magazine.

Military

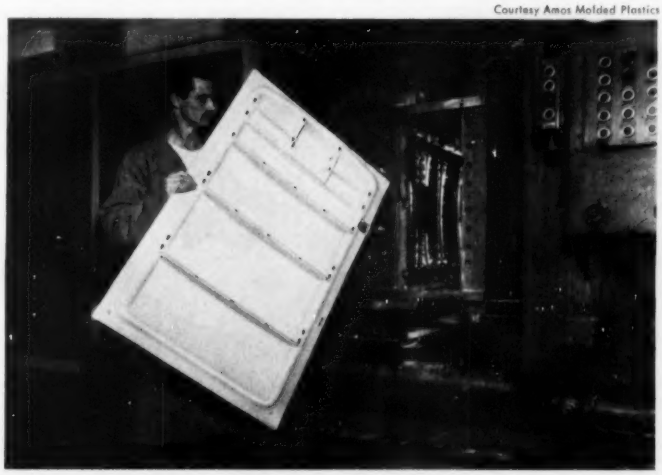
Most of the new plastics applications for the defense program during the year were immediately classified as confidential or secret. Just how much and in what capacity they were being used cannot be stated. But one thing was certain. The total volume used by and for the military was nowhere as much as many in the industry had expected it to be.

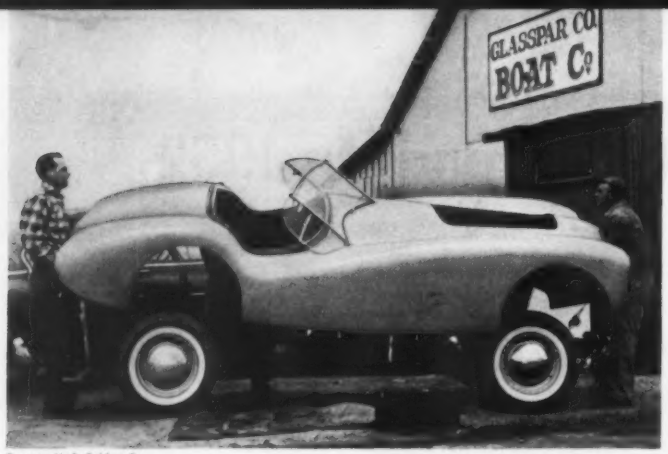
In other phases, however, the military did not disappoint. Research carried on during the year under Armed Forces contracts continued to result in developments of interest to manufacturers of civilian products. Architects and construction engineers kept alert eyes on an experimental jet plane alert shelter constructed of reinforced plastic panels laid in between magnesium arches (July issue) while commercial boat builders studied the U. S. Navy's experimentation program on reinforced plastic boat hulls (November issue). At the same time, electrical engineers were watching carefully the Army's use of fluorocarbons as wire coating, in resistors, and in brushes, tube sockets, and insulators.

Of the unclassified new military applications in 1952, flotation suits and body armor captured most of the limelight. The much publicized flotation suits were made of Ensolite, a cellular sponge vinyl, and

Outstanding advance in the appliance field was a refrigerator door liner injection molded of styrene copolymer in one piece; liner has a projected area of over 1200 sq. inches

Courtesy Amos Molded Plastics





Courtesy U. S. Rubber Co.

Sports car body molded of reinforced plastics was put into commercial production in 1952; body, weighing only 185 lb., proved itself strong, resilient, and easy to repair

served the twofold function of keeping a man afloat and protecting him against the cold; the equally publicized body armor consisted of laminated fibrous-glass plastic plates fitted into pockets in a nylon jacket.

At least two other innovations in plastics were developed for the Army in 1952. One, a food container, made use of shredded urea foam insulation and supporting blocks of expanded copolymer sheet (September issue). The other, a sled designed for Arctic use, was molded of reinforced plastics (April issue).

Industrial

First, and perhaps most significant industrial application of plastics in 1952 was the emergence of plastics pipe applications from the swaddling infancy of two short years ago to a full-grown industry bursting with potentialities (May issue). The diversity of materials that went into the production of plastics pipe for a wide and varied range of industrial uses was indicative of a momentum-gathering trend. It was indeed a big and promising year for plastics pipe. Polyethylene pipe was being produced in quantity by a number of companies; butyrate pipe became an important factor for handling gas, oil, and water. Reinforced polyester pipe was in production and being tested by the Navy for shipboard use. Rigid vinyl pipe went into wider production for use in chemical processing systems. By

Unusual application of plastics in the toy industry was a doll completely injection molded of vinyl. In simplified assembly, limbs are connected to torso without use of tools

Two-part butyrate handle and butyrate insert (below) for extension flash-holder (left) exemplified growing acceptance of rugged, attractive plastics in photographic equipment

Courtesy Eastman Kodak Co.

the end of the year, one company had installed the first experimental length of butyrate pipe for power line conduit (December issue). New horizons were being opened.

Elsewhere in the industrial field, reinforced plastics provided a big news story for 1952. A polyester resin-impregnated Fiberglas tank was developed for use on trucks transporting Diesel fuel, gasoline, and potable water through desert areas (June issue). Encouraged by the success of these corrosion-proof tanks, plans are already being projected for reinforced plastics storage facilities for gasoline, oils and corrosive chemicals.

Many long established industrial applications found ever-widening use during 1952. Nylon gears, for example, gained considerable ground, and the electrical market for the silicones broadened extensively. Molded vinyl sheet found a new use as a protective lining for pipe (January issue). The epoxies continued their progress, the newest in epoxy resin formulations being an elastomeric material (October issue) which holds great promise in adhesives where shock resistance is of importance and in potting compounds where components are subjected to vibration and high impact shock. With the increasing emphasis on electronic miniaturization, epoxies used in printed and potted circuits took on special significance.

Silicone fibrous glass laminates and silicone glass tape became an integral part of the new Class H electrical insulation that made possible a longer life and a 25 to 40% reduction in size of motors and transformers (September issue).

The increased production of rubber-phenolic in 1952 (February issue) helped greatly in ironing out many molding problems and opened, thereby, a whole new series of job possibilities for cable clamps, gear blanks, bobbins, etc.

The increased use of styrene copolymers and alloys found outlets not only in industrial pipe and fittings, but also in the automotive, household appliance, and toy fields as well (November issue).

Perfection of the vacuum forming of rigid sheet materials brought trays, racks, housings, and tote boxes to industry, and expanded, at the same time, application possibilities in almost every other field. A series of three articles in July, August, and September MODERN PLASTICS recognized the growing, almost fanatical, enthusiasm that was being shown by fabricators and end users alike for the vacuum formed sheet thermoplastics.

A new molding compound of alkyd resin and fibrous glass, said to have a greater impact strength than any other molding compound, was described in the February issue as already at work in caster wheels, machine gun handles, and electrical parts. Another material development that opened markets in electrical applications was a low cost urea that was made available in black and brown.

Toys

At a recent exhibit of toys being marketed for 1952, an estimate of those that were either all-plastics or had important plastics parts ran to more than 75% of the total. The figure is illustrative of the tremendous influence of plastics in toys.

The doll field especially, where the warm, natural look and feel of plastics make them ideally suited for the industry's growing trend toward realism, was almost fully saturated (June issue). One doll was introduced at the end of the year that was completely injection molded of vinyl (November issue).

As in other applications of 1952, the material and process that gave the toy designers plenty to think about was the vacuum forming of styrene copolymers. One manufacturer reported excellent success with a vacuum formed styrene copolymer horse's head that could be attached to a bicycle in place of the handle bars. On an experimental basis, another manufacturer had formed a one-piece body for a pedal-powered toy car (June issue) and was immensely impressed with its practicality.

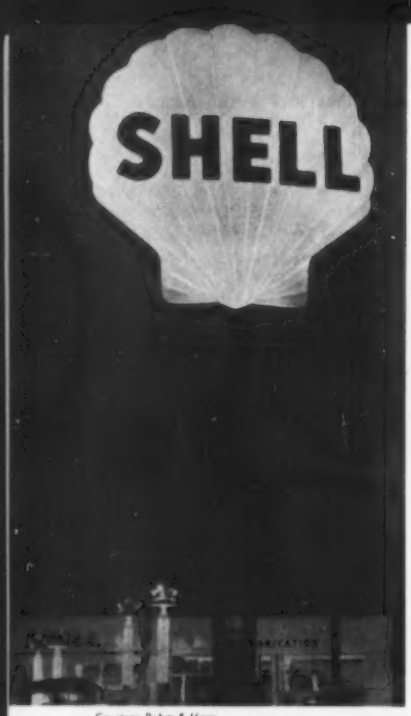
Automotive

The big 1952 buzz in the automotive field was the much talked about and long awaited reinforced plastic automobile body (April is-

Among new applications developed under Armed Forces contracts was an experimental jet plane alert shelter built of reinforced plastic panels laid in between metal arches

Courtesy East Coast Aeronautics, Inc.

Perfection of processing technique in the slush molding of plastisols led to the production of a one-piece rain boot with reinforced heel and toe



Courtesy Rohm & Haas

Acrylic sign, made up of two formed sheets, measures 8 ft. in diameter

sue). Exhibited at the Fifth National Plastics Exposition in Philadelphia, the auto body elicited much comment and much discussion. The question most frequently asked by observers was: Could mass production principles ever be teamed up with the desirable strength, wearing qualities, and easily repairable nature of the reinforced plastics car body? The future should hold an interesting answer.

There were few new applications of plastics in the rest of the automotive field, but a characteristic expansion of established uses was apparent. MODERN PLASTICS reviewed this phase of the industry in the August issue and came up with several conclusions: Plastics are being taken more seriously in the automobile, are being used with greater imagination and sounder purpose. The perfection of metallizing and plating techniques have increased the uses of acrylic, long the favored material for auto lenses and decorative ornaments. Molded nylon in the 1952 car moved into a number of new mechanical applications, ranging from door striker wedges and speedometer take-off gears to brake pedal arm bushings and garnish grommets. Acetate and butyrate found increasing use in control knobs, radio grilles, brake handles, and steering wheel knobs. The copolymers gained ground in station wagon roof rails, wheel house covers, and crash panels.

The over-all picture of the part that the plastics industry played in the 1952 automobile is a big one—the part it will play in the car of tomorrow will be bigger yet.

Communications

Vacuum forming of rigid sheets for tube protectors and masks was the outstanding development in radio and television. The styrene alloys were particularly important in this respect in view of the possibilities of vacuum forming a part having a short run and later translating the design into injection molds for a long run.

An interesting note, in line with the perfection of decorating techniques mentioned above for automotive applications, was the intricate metallizing and painting operations that went into glamorizing a molded styrene dial for a TV set (December issue).

Household

With most of the stand-by household plastics applications expanding in volume during the year and a whole new series of potential applications arising, the outlook for 1953 is good.

Polyethylene's increased availability by the middle of 1952 opened up new markets in housewares. Toward the later months, a variety of squeezable bottles and food tubes, freezer jars, etc., began to appear with great regularity. Job prospects for the future ran high.

There was one radical departure

Courtesy General Electric Co., Chemical Div.

Future possibilities of plastics laminates in the home were given impetus in 1952 with the one-piece molding of seamless melamine-surfaced laminate for kitchen or bathroom

in housewares applications in 1952. That was the durable, lightweight, reusable picnic plate vacuum formed of styrene copolymer (August issue). Melamine, of course, expanded in the dinnerware field and is progressing in other allied directions. For example, the July issue of MODERN PLASTICS reported the use of melamine as a replacement for porcelain and stainless steel fountain jars, and melamine cutlery handles are in the offing.

The continued development of larger and larger moldings turned the appliance industry—particularly refrigerator manufacturers—more and more to the advantages offered by plastics.

One of the most important developments in the refrigerator industry during 1952 was the injection molding of one-piece refrigerator door liners (April issue) having integral supports for shelves, egg compartments, and butter storage sections. Described as the largest injection molded part ever made, it measured 43 by 28 in. by approximately 6 in. deep and had a projected area of over 1200 sq. inches.

Vacuum forming of styrene copolymer and alloy sheet made inroads in the refrigerator industry during the year, which seemed a sure prediction of the course that would be followed in 1953. The low thermal conductivity of the alloys, combined with their toughness, makes them a natural for such refrigerator applications as breaker strips and evaporator trays. Already produced and successfully used have been vacuum formed styrene copolymer drip pans; already in experimental production is a refrigerator door liner, vacuum formed on a wooden mold.

Perhaps the most unusual application of plastics in refrigerators thus far is found in the Servel refrigerette described in the November issue of MODERN PLASTICS. Considering that some 30 lb. of the refrigerette's total 80 lb. weight is plastics, this portable unit represents a close approach to an all-plastic refrigerator.

Another group of products to which plastics were increasingly applied during the year was housings for electrical appliances. A vaporizer (November issue) made a successful transition from a porcelain to a phenolic housing; a floor polisher (April issue) was fitted with a molded cellulose acetate cover; and an air conditioning unit was housed in phenolic (August issue). One noticeable trend in this direction was the revival of urea for housings. The home food blender described in the August issue was housed in urea, as was the home fire extinguisher described in the October issue.

Furniture and Architecture

The tremendous impact of plastics laminates was felt in every room of the house in 1952. Kitchen, living room, bathroom, dining room, and bedroom—all became markets for laminates of various types. A melamine-laminate unit (April issue) for use as a kitchen or bathroom work surface integrated the advantages of a one-piece molding to form the horizontal surface, a dripless front edge, and a vertical backsplash.

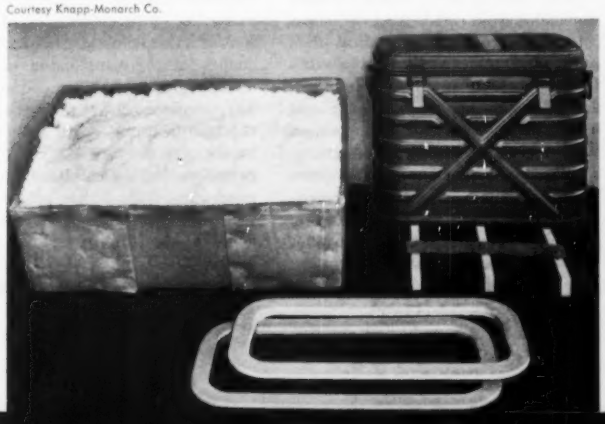
In home construction, particularly in the surfacing and bonding of woods, plastics found increased popularity (October issue).

In other construction applications, corrugated polyester-Fiberglas sheet materials for skylights,

Picnic plate, vacuum formed of extruded styrene copolymer sheet, is light in weight but durable and completely reusable. Production rate of 700 plates per hr. is possible

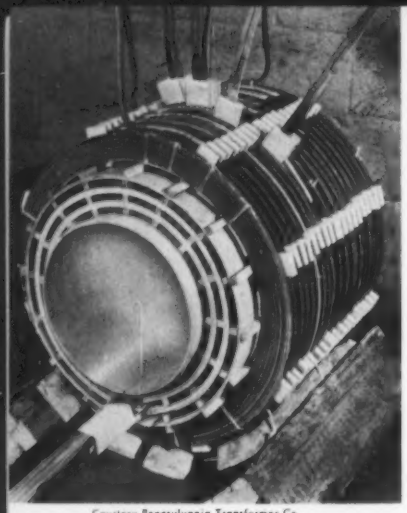
One of the few unclassified applications announced by the Army was a food container (top right) using urea foam insulation (left), phenolic collars, and copolymer supports

Courtesy Knapp-Monarch Co.



Ease of joining sections contributed to growing popularity of plastics pipe

Courtesy Tennessee Eastman Co.



Courtesy Pennsylvania Transformer Co.

Silicone resins now form an integral part of Class H insulated transformers

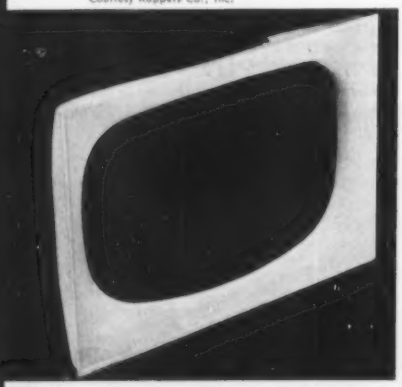
porches, and awnings maintained their importance. Users of the product increased substantially in 1952 and the trend is still upwards.

Within the home itself vinyl and saran were even more widely employed in drapes, upholstery, etc. In both materials, the development of new patterns and embossing techniques made the plastics almost indistinguishable from more expensive fabrics, and opened new avenues of use. Saran, in particular, has almost completely saturated the outdoor furniture field where its durability, color, and weather-resistance make it an ideal fabric.

By the end of the year, two developments had been introduced that gave further impetus to the growing demand for saran. The jacquard weaving of saran (July issue) produced new patterns in florals, abstracts, and geometrics; the availability of saran in continuous multifilaments (September issue) promoted its use for commercial applications in industrial textiles and drapery fabrics where acid and alkali resistance is required.

Tube shield for TV set makes economical use of the durable styrene alloys

Courtesy Koppers Co., Inc.



Apparel and Accessories

This was the year of the synthetic "wonder" fibers. The brand names—Orlon, Dacron, Vynel, etc.—that had become familiar words by 1951 became household words in 1952.

The vinyls took on new importance in personal accessories. Development of embossed patterns that gave vinyl the natural appearance of leather provided the high fashion appeal that made luggage and wallets especially acceptable to the consumer.

Some of the most interesting production jobs of the year were being done with the slush molding of plastisols. Advances were made in both materials and processing techniques, the latter particularly with regard to rain boots and rain hats. One company perfected a system of production control of solution viscosity, speed and temperature of cure, and mold surface preparation in the manufacture of a one-piece rain boot with reinforced heel and toe (November issue).

Signs and Displays

The use of vacuum formed sheets was a major innovation for 1952 in the field of signs and displays. Its use became even more practical during the year as printing techniques were developed, particularly the process of printing the desired illustration in distortion before forming.

Back illumination made three-dimensional formed acetate signs into attractive, eye-appealing displays. The economic advantages offered by these signs were emphasized by a large, illuminated Santa Claus display, made at the rate of 95 per hr., including pre-heating, forming, and removal from press (August issue).

Acrylics, with their outstanding optical qualities, again captured the greater share of the display market. Like other rigid sheets, their potentialities were advanced by the perfections in extrusion and vacuum forming (September issue). On the bigger jobs, such as an 8-ft. sign fabricated of Plexiglas, injection molding could not economically compete with sheet forming.

Another development that fulfilled the promises made in 1951, embraced the cast vinyl sheet signs which can be stuck to any smooth surface without the use of adhesives. One company also introduced signs of similar appearance that were made of cellulose acetate and a pressure-sensitive adhesive (November issue).

Photography

Plastics in cameras have been widely accepted for years; the desire of the photographer for his equipment to look right, feel right, and perform perfectly under all circumstances and conditions has led recently to an increased use of plastics in accessories as well.

Typical examples that were reported in MODERN PLASTICS are the photo flash holder that depended almost completely on plastics—its handle inserts, ejector and solenoid switch buttons, and insert cores were butyrate and its insulation plates and plugs were phenolic (May issue); a flash unit battery case fabricated from copolymer sheet (October issue); and a formed copolymer sheet housing for the power packs used in special high-speed photography (November issue).

In a related field, plastics enjoyed wide use in film viewers and slide trays. The June issue contained a review of several new applications of this type that had successfully used phenolic and styrene.

The Future

Briefly mentioned in this compacted review of plastics application trends in 1952 are a number of new materials or new forms of old materials. The plastics industry becomes more complicated by the minute (November issue editorial). The simple days are gone. But with the complications come new opportunities for plastics. Many of the applications of 1952 point the way. The successes of tomorrow are in those hands which are ready, willing, and able to see the opportunities offered by technological advances . . . and to make the most of them.

Why Bell & Howell Uses Butyrate

Case, handle, and base of plastic material contribute to lower cost, light weight, and predicted sales record

Functional design of a new model 8mm projector makes use of a two-part butyrate carrying case that doubles as an integral part of the machine

NEW concepts of construction and styling, made possible largely through the use of plastics, are reflected in the Model 221 8mm movie projector recently unveiled by Bell & Howell Co., Chicago, Ill., one of the nation's foremost producers of professional and amateur movie equipment. This compact new model, which will accommodate 400-ft. reels for a full half-hour show, is built on an all-aluminum frame and designed with a self-contained case molded of Tenite II cellulose acetate butyrate, as well as a base and carrying handle of the same material.

In developing the new projector, Bell & Howell set up specific requirements based directly on specifications submitted by a panel of its top dealers. These representatives recommended that the unit be light in weight, priced below $100 retail, and so designed that it could be easily operated by women or even children. Prior to introduction of the Model 221, which weighs only 12 lb. complete with its plastic case, the company's lowest priced 8mm projector sold at $179.95. According to Carl Schreyer, merchandising vice president of Bell & Howell, the company expects the new model to sell in greater volume than any other product ever manufactured by the company.

Built-in Carrying Case

By designing the Model 221 with a carrying case which is actually an integral part of the projector, B & H was able to avoid the cost of a separate case without compromising the quality of the equipment. The

Projector is designed for easy operation (left) after the removable front section of the butyrate carrying case has been detached (above). Rear section is permanently mounted to the unit and functions as a housing for working parts

case is composed of two vertical halves, with the right section (or front) removable when the projector is operated, and the rear half permanently mounted to the unit, forming a housing for the motor, take-up and feed-belt pulleys, and other moving parts. This side of the case is screwed directly to the heavy gauge aluminum center plate which forms the "backbone" of the projector. Neither half of the case carries any of the weight or structural load of the projector.

The design of the Model 221 was engineered by E. W. Zacharias of Bell & Howell; appearance design was by Peter Muller-Munk Associates, Pittsburgh, Pa. General Electric Co.'s molding division at Decatur, Ill., produces the four plastic components of the projector. The cover is in light grey, the base a rich maroon, and the handle a dark grey.

The total amount of butyrate used in the projector is slightly more than two pounds, divided as follows: Fixed cover, 11½ oz.; removable cover, 11 oz.; base, 9¾ oz., and handle, 2 ounces. According to the manufacturer, butyrate was specified for the plastic parts because it is easily molded to the desired design and offers a rich, glossy appearance; its high impact strength permits the projector to absorb average mishandling without damage to the case or interior parts; it is light in weight and has a broad color range, as well as consistency of color and minimum fading; and it is economical—the cost of the molded plastic case is lower than plywood, stamped metal, or castings. Added advantages are the fact that the plastic case has no applied finish to peel or chip, and, of course, the plastic case will never be disfigured or weakened structurally by the effects of corrosion.

Ribbed for Strength

In exterior appearance, the front and back covers of the projector are identical, having a series of horizontal ribs which provide modern styling and good strength. A harmonizing ribbed treatment is used on the metal lamp housing. The removable front section, which is gated at two points along the bottom edge and runs in a single cavity mold, has three projecting tabs at the bottom which fit into slots in the butyrate base. An offset lower edge on both halves of the case provides a secure mating fit to the base. The front cover is held in place at the top by means of a spring loaded button type latch which engages a cored opening beneath the carrying handle.

Like the fixed half of the case, the front cover carries the Bell & Howell name intaglio molded on its outer surface, filled in with maroon paint for increased legibility. On the inside, the first, second, and sixth ribs are reinforced at the ends by fillets and there are also two strengthening internal ribs across the top. Three small projections on the inner surface keep the projection reel from shifting position when the projector is carried. The two openings molded through the top of this component are for attachment and engagement of the latch button.

The fixed half of the case, also molded in a single cavity mold, is center gated at the lower edge. Its design called for four cored internal bosses—two at the top and two at the bottom—for attachment of this part to the projector chassis. The bosses at the top are formed by knockout wedges in order to

mold an undercut below them without producing sink marks on the outer surface. Two cores in the forward edge of this half of the case accommodate the tilt knob and hand threader knob of the projector. At the top are additional slots and openings for the handle, which bolts directly to the aluminum center plate, and the coil spring drive and rewind belts.

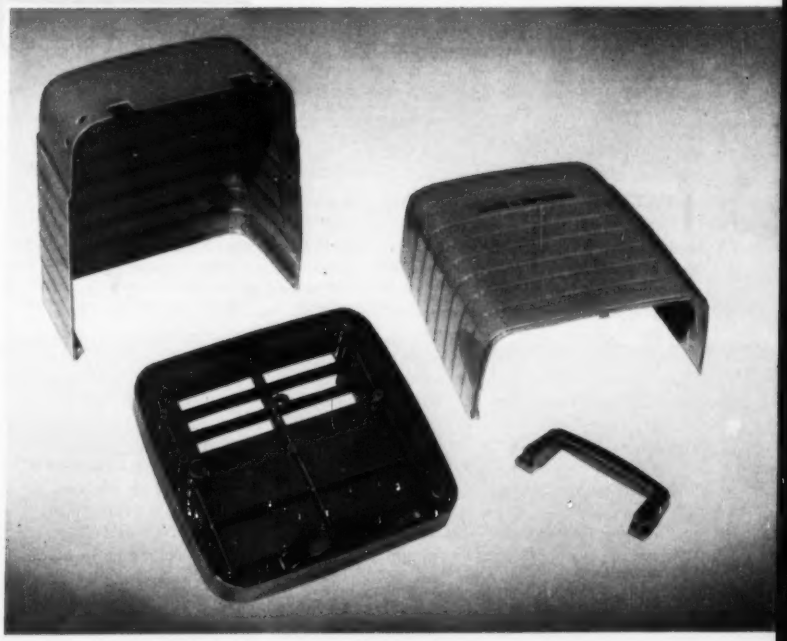
The butyrate base, produced in a single cavity mold, is heavily center gated on its bottom surface. Cooling clamps are employed to forestall warpage in this part. Bearing the entire weight of the projector, the base is designed with a substantial wall section and heavy ribs on the underside for added rigidity. Among its details are two blind cored bosses at the back, into which rubber pads are cemented, and a through-cored boss at the front through which the front foot, on a sliding metal rod, is mounted. The manufacturer's name and electrical rating of the projector are molded in relief on the underside of the base.

Molded-In Louvers

The left side of the base has a series of six louvers through which heat from the electric motor is dissipated. There are also several additional openings in the base, including that through which the electric cord passes to the bottom of the projector and others used in fastening the metal chassis to the base. Mounting holes in the metal bracket supporting the center chassis plate were made oval in shape to take care of variables in shrinkage of the base.

The attractively designed handle, affording a generous 3½-in. finger space between the ends, is molded with cored openings for attachment to the chassis. Molded in a four-cavity mold, it is exceptionally sturdy, having a maximum thickness of $^{11}/_{16}$ inch. Cooling forms are employed by the molder to maintain proper tolerance between the mounting holes. The handle is so designed that the parting line is hardly noticeable because of its location on the side of the molded piece.

Total weight of the complete unit, including both case and projector, is only 12 lb.; total amount of butyrate used is slightly more than 2 pounds



Three of the butyrate parts—back section of case (top, left), base (center), and handle—are cored for easy assembly. Front section (far right) has projections that fit into slots in top of base

All photos courtesy B. F. Goodrich Chemical Co.

Tension wires which are to be used in auto seat cushions are placed on racks that will carry them through a conveyor type coating machine. Wires will emerge from the opposite end of the machine coated with vinyl plastisol and ready for installation

Ford Seat Cushions are Noiseless

Coating of vinyl plastisol on tension wires in cushions replaces jute wrapping, provides protection against moisture and wear

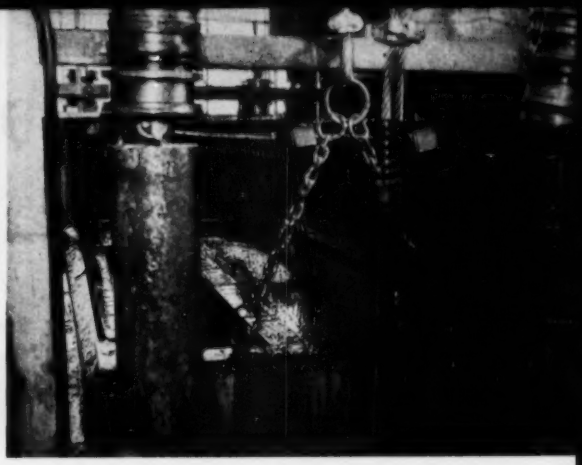
THAT noisy "click-clack" sometimes heard from a flexing automobile seat cushion is eliminated in the new Ford line by coating the numerous tension wires in the cushion with a vinyl plastic. Before this coating process was developed, a soft, felt-like jute material about ½ in. thick was wrapped around the tension wires to prevent the metallic click caused by deflection of the cushion. Now, the vinyl plastic coating, compounded by Houghton Laboratories, Inc., Olean, N. Y., also provides resistance to moisture and weathering; in addition, the abrasive action does not wear through the vinyl plastic as it often did in the old type jute material.

A long conveyor type of machine is used to coat the tension members with the plastisol, compounded from B. F. Goodrich Chemical Co.'s Geon paste resin. First, uncoated wires are placed by hand in racks at one end of the machine; these filled racks are then moved into a pre-heat oven at 200 to 250° F. for approximately 15 min., or until they reach a temperature which will insure the proper amount of plastisol pickup in the dipping stage.

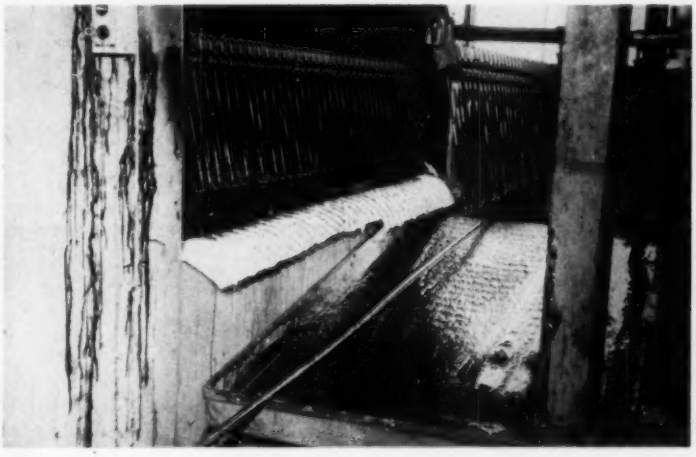
The actual dipping operation utilizes a large vat filled with plastisol. This vat is raised by air pressure to bathe the wires suspended from the racks to obtain a minimum coating thickness of 0.015 inch. The tension wires are then drained, the amount of drainage depending upon the wire pre-heat and viscosity of the plastisol, and conveyed to the cure oven for approximately 15 minutes. The fused wires are then removed from the racks and shipped to various sub-assembly points to be incorporated in the finished seat frames. From these assembly points the seats are then sent to the Ford Motor Co. where the fabric and padding are installed.

The commercial possibility of coating other types of springs with vinyl plastic is entirely practicable, and the near future should see much of this work actually becoming a reality. The millions of coil springs used annually in bed mattresses, couches, and chairs present a substantial potentiality.

Immediately after the wires have passed through a special pre-heat oven, they enter the second, or dipping, stage of the coating process. Here they are suspended over a large tank of vinyl plastisol which is raised by an air cylinder until wires have been completely covered

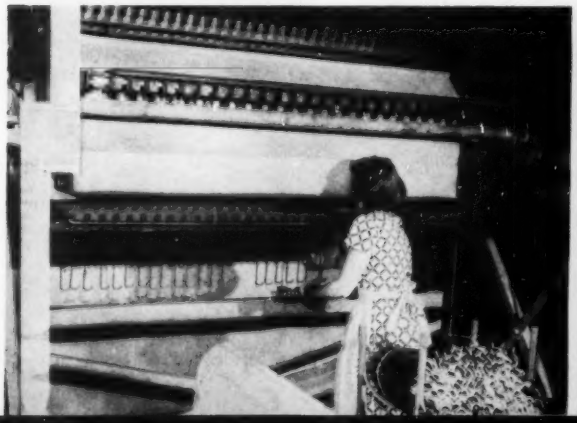


After the wires have been bathed in plastisol, the tank is slowly moved downward. The coated wires, dripping excess material, are carried away to the next step, while a new, uncoated set (seen on the right emerging from the pre-heat oven) is conveyed into position



Excess plastisol continues to drain off the coated wires as the conveyor carries each set (from right to left) over a wide draining board. Amount of drainage depends upon viscosity of the plastisol and temperature to which wires have been heated

After excess plastisol is completely drained off, the coated wires pass through a curing oven for approximately 15 minutes. With the coating completely cured, the wires are conveyed to the final station, removed, bundled, and shipped to sub-assembly points to be incorporated into finished seat frames



Seat frame, complete with 34 noiseless and abrasion-resistant coated tension wires, is transformed to final assembly line. Workman puts the frame over cushion padding preparatory to stapling it securely in place

DISH WASHING

ANY husband who has taken his turn at dish washing or drying at home can appreciate the dish washing problem which confronts the average restaurant. Public eating places, serving hundreds of meals daily, must schedule their operations to cope with rush-hour periods. Surveys have shown that the chinaware and glass required to serve an average meal for 100 persons weighs as much as 519 lb. and requires six hours of washing.

Officials of Bowes Industries, Inc., Chicago, Ill., which several years ago introduced plastic surfaced plates for home use, have now pioneered a new approach which has won the enthusiastic approval of restaurant operators. The Bondware Empire service utilizes plastic surfaced paper plate liners in conjunction with specially designed molded Melmac holders which grip the liners securely, yet may be quickly separated from them when the used liner is to be replaced.

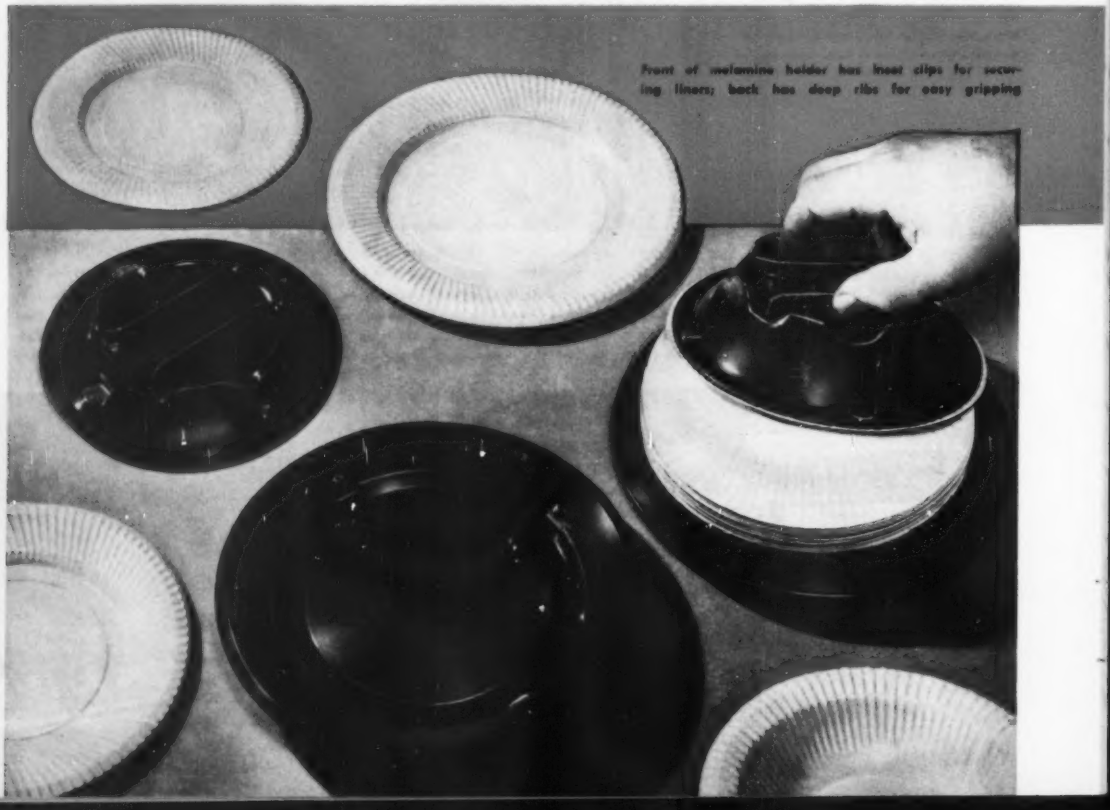
Speed and Economy

Advantages of the new system include reduction of labor costs, economies of weight and space, and increased speed of service. For example, 280 of the liners weigh less than seven china plates and take less space than 25 china plates. Tests have shown that the plastic service saves money by cutting down on the payroll through elimination of dish washing and bussing. In addition, from 10 to 25% more customers may be served during peak periods and heavy investments in chinaware and dish washing equipment may be eliminated.

The industrial design firm of Lippincott & Margulies, New York, cooperated with Bowes Industries in developing the molded plastic holders and the special light-weight liners used in connection with them. Designed for beauty as well as utility, the liners are colored a rich adobe tan on the top surface, complementing the chocolate brown color of the holders. The three sizes included in the service are 9-in dinner plates, 7-in. salad and pie plates, and bowls. Plastic-surfaced liners are made in both the 7- and 9-in. sizes for hot or oily foods; uncoated liners are available for sandwiches, cake, and other dry foods.

The taste-free plastic surface of the paper liners, smooth and shiny as china and absolutely soak-proof, is so hard that even knives will not cut it. No food, hot or cold, will penetrate the plastic surface, which is the same as that used on the standard line of Bondware plastic coated plates for home use. The coating will withstand temperatures as high as 400° F. or more, and has been approved by the Bureau of Standards for military feeding operations.

Since the liners are supported by the melamine holders, they are made lighter in weight than the regular Bondware plates and will not slide around on the table or counter. All liners are stacked, face down, on dispensers which hold them in position so that they pick up readily when the holder is pushed down on the stack and twisted slightly.



Front of melamine holder has inset clips for securing liners; back has deep ribs for easy gripping

ELIMINATED

New restaurant service system utilizes disposable plastic-surfaced paper plate liners

By pressing holder down on stack of liners and twisting slightly in either direction, the liner is firmly gripped by the steel clips and cannot slip off when being used

Taste-free plastic surface of liner is smooth, sealproof, and impervious to either hot or cold food. Attractive tan coloring offers customer eye appeal

Dish washing problems are eliminated by simply discarding the used liner at the end of the meal and restacking the reusable holder on top of the pile

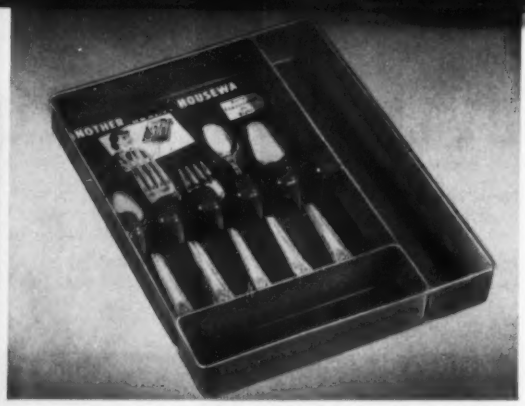
The ingeniously designed holders, made in three sizes, offer the rigidity of china but are far lighter and easier to handle. Each holder has four small stainless steel clips which extend through slots in the holder and grip the ribs of the liner. By slightly rotating the holder in either direction, the metal clips score deeply enough into the ribs of the liner to grip it firmly. The top surface of the holder is completely covered by the rounded lip of the liner.

Preheated Preforms

The plastic surfaced liners are manufactured by Bowes in two of its own plants. The holders, made of alpha cellulose filled melamine material, are molded by Werner Mfg. Co., Brookfield, Ill., using electronically preheated preforms. Finishing operations on the holders includes removal of the slight edge flash and attachment of the stainless steel clips, which are inserted through cored slots in the sides of the holders and secured with rivets.

Costs of the new liner and holder service is said to compare favorably with dishwashing costs on any basis. In lots of 50,000, an average of various sizes of the plastic coated and uncoated liners cost the restaurant less than one cent each. The sturdy holders, of course, may be used indefinitely. According to a survey by Roy D. Mock, research engineer, reported in *American Restaurant Magazine*, costs of washing a dish in restaurants today vary from 0.8¢ to 2¢ each, depending upon type of restaurant, method of dishwashing, labor rate, etc. Studies made in ten independent restaurants showed an average cost of 1.06¢ for washing one dish, based on a labor rate of $1. per hour.

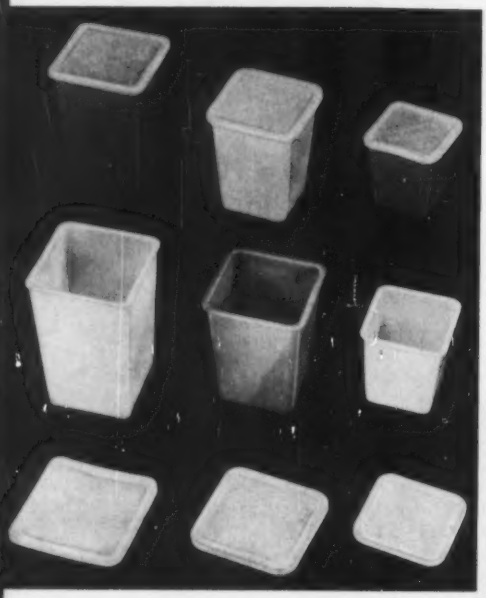
Charles H. Good, Sales Promotion Manager of Bowes Industries, points out that while china costs vary, the average restaurant spends about $500 for its original stock and approximately $100 per year to replace broken pieces. "You can buy all the plastic surfaced paper plates you need," he says, "on what you save by not having a dishwasher."



Cuttery tray, measuring 9½ in. wide, 14 in. long, and 1¾ in. deep, is molded of Lustrex styrene. The three separate compartments into which the tray is divided have extra large capacity for accepting long utensils. The selfstacking unit is produced in yellow, red, and other pastel shades by Loma Plastics, Inc., 3000 W. Pafford St., Fort Worth, Texas

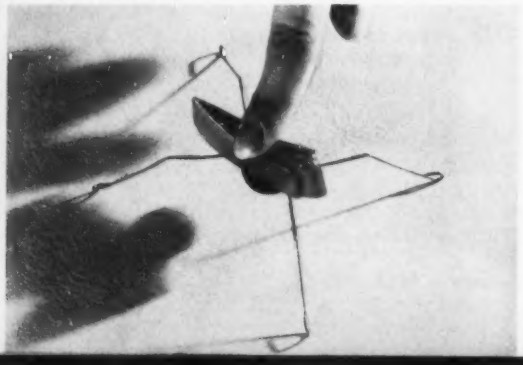
A new idea in speedier and more efficient laundering is a special glove which is slush molded of a Marvinol vinyl resin. The lightweight glove is smooth and pliable enough not to damage such delicate fabrics as silk or nylon; it is, however, produced with a corded surface across the palm that uses the old-fashioned washboard principle for cleaning more stubborn dirty spots. It is made by Dean Vail Corp., Paterson, N. J.

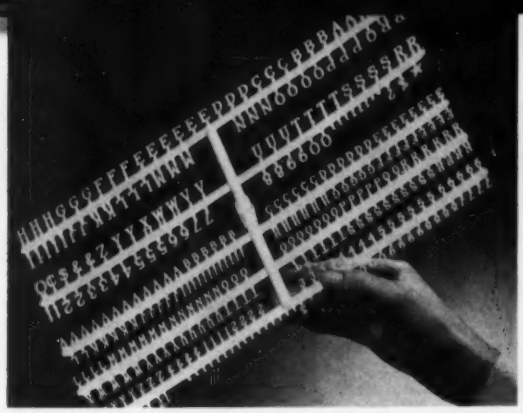
PLASTICS



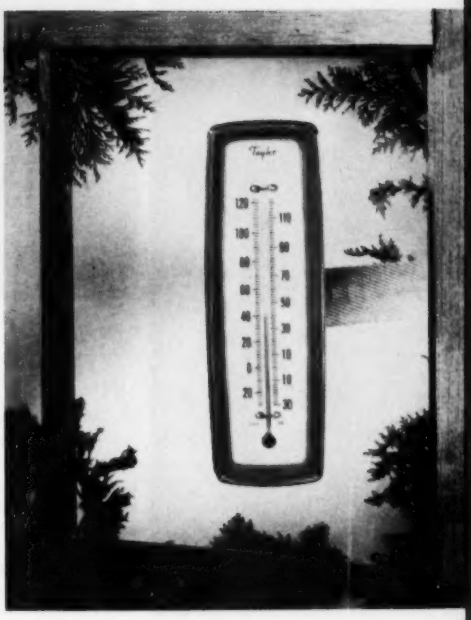
Unbreakable polyethylene freezer jars for preserving, storing, and protecting foods are designed to be neatly stacked in any refrigerator. Each of the Freez-Paks has a snugly-fitting crystal polyethylene lid that locks in place over the top of the jars for a vacuum tight seal. Jars come in three sizes—8, 16, and 25 oz.—and are made in red, green, yellow, blue, and crystal by Rogers Plastic Corp., West Warren, Mass.

A styrene grasshopper-shaped body, four spring wire legs, and a rubber suction cup form a fascinating new jumping toy for children. To operate, the grasshopper is pressed down with the legs spread apart and adhered by suction to any smooth surface. When the hand is withdrawn, the force of the legs springing back into position soon propels the toy high into the air. Made by Thomas Mfg. Corp., 80 Clinton St., Newark 5, N. J.





Letters, numbers, and symbols for the sign panels of office bulletin boards, restaurant menu signs, etc. are injection molded of white Tenite I cellulose acetate. Some 360 of the smaller sized, chip-proof figures can be produced in one shot in a multi-cavity mold. Small nibs extending backwards from the lower edges make the units easy to insert in a panel. Molded by Uneeda Sign Service, 270 Bowery, New York 12, N.Y.



Outdoor window thermometer has a translucent white Tenite II cellulose acetate butyrate back plate and a contrasting case molded in aqua-green butyrate. Light through the translucent back silhouettes the scale markings for better visibility from a distance. Molded by Norton Laboratories, Inc., Lockport, N. Y. for Taylor Instrument Co., 95 Ames St., Rochester, N. Y.

PRODUCTS

Attractive styrene pitcher for light syrups, cream, milk, etc., is claimed to have a completely dripless spout. To prevent liquids from running over and down the sides of the pitcher, the lip of the spout is formed with a special curvature that scientifically takes advantage of the laws of surface tension. The styrene cover does not have to be removed for pouring. Made by Valley Forge Sales Co., Malvern, Pa.

Cellulose acetate frame and lens of a new all-plastic eye shield provide low-cost eye protection in semi-hazardous operations. The lens, either in crystal clear or green acetate, is a flexible one-piece unit that can easily be replaced by bending and snapping it in or out of place. The shield can be worn over regular corrective safety glasses to prevent lens pitting. Developed by Bausch & Lomb Optical Co., Rochester, N. Y.

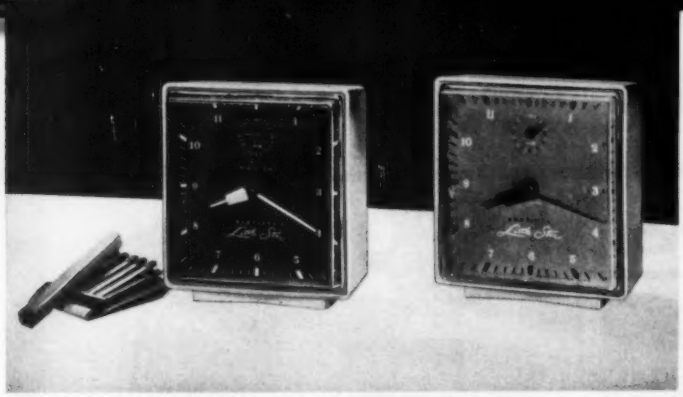
An innovation in Christmas tree and gift ornaments is a colorful series of three-dimensional Yuletide symbols vacuum molded of Vinylite rigid plastic sheet. Ten ornaments are formed on one 9- by 15-in. sheet and die cut so that they can easily be clipped or pushed out by hand. The lightweight, nonflammable—and inexpensive—figures will resist distortion despite rugged wear or handling. Made by Borkland Mfg. Co., Div. Borkland Laboratories, Marion, Ind.

Functional design of a Hercocel A cellulose acetate bathbrush handle offers two conveniences to users of the accessory—an open-center pattern that permits the brush to be hung out of the way when not in use and an easy-to-grip shape. The handle will retain its white coloring even after prolonged use. It is molded by Prolon Plastics, Florence, Mass., and Worcester Moulded Plastics Co., Worcester, Mass., for Stanley Home Products, Inc., Westfield, Mass.

PLASTICS

A versatile 3½-qt. thermal bucket, with double walls 1½ in. apart, can be used at home or on picnics to hold ice or to serve hot foods. The entire unit, including a cover held in place by a metal slip-fit hinge, is molded of Lustrex styrene. The hinge can be pushed back and off when the cover is to be removed for washing. The bucket is gracefully designed in gray, bronze, green, mahogany, or copper by Victoria Creations, Div. Victory Plastics, Hudson, Mass.

Polyethylene flacons, blow-molded to reproduce the shape and appearance of antique Venetian crystal, serve as purse-size dispensers or atomizers of cosmetics. Each of the squeezable Plaxpak bottles is supplied with a tiny polyethylene funnel for neat and easy filling, a gold screw cap to prevent leakage, and a capillary tube for spray action. Tubing may be removed to dispense heavier liquids. Flacons are distributed by Natone Co., 1207 West 6 St., Los Angeles, Calif.



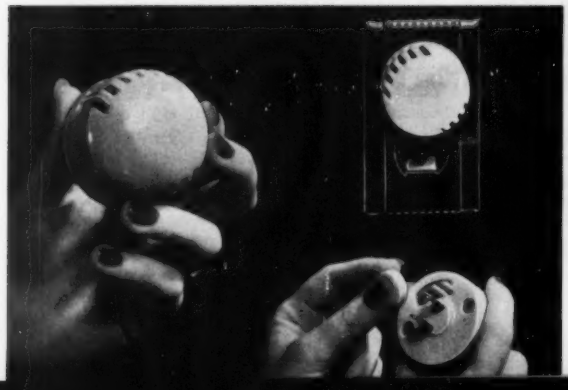
Miniature alarm clock is housed in a square-shaped ivory styrene case and has a transparent styrene crystal. Measuring only 3½ in. high by 3¼ in. wide, the shatter-resistant timepiece, available either with or without radium dial, is especially suited for use as an inexpensive travel clock. A felt pad cemented to the base and a plated brass bezel around the inside rim complete the unit. Molded by T. F. Butterfield, Inc., Naugatuck, Conn. for The E. Ingraham Co., Bristol, Conn.

A fashionable addition to a new Ultron vinyl film raincoat is a matching draw-string bag to be used as a package for the coat when traveling or as a waterproof cover for a handbag in stormy weather. The raincoat is available in several patterns and will retain its softness and draping qualities at temperatures as low as —35° F. It is made by Eisman, Ewen, & Rose, Inc., and distributed by Penthouse Products, both of which are located at 377 Fifth Ave., New York 16, N. Y.

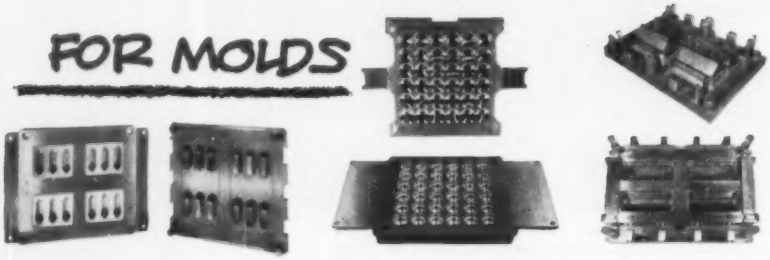
PRODUCTS

Projection number plates for use over room doorways in schools, hotels, or hospitals are molded of Tenite II cellulose acetate butyrate. The plates measure 2 by 5 in. and project lengthwise from butyrate brackets in which they come permanently mounted. Numerals and letters are 1½ in. high and are hot stamped in white against contrasting colors—black, red, green, or gold. Plates are made by Plastic Tag & Trade Check Co., Fourth & Saginaw Sts., Bay City, Mich.

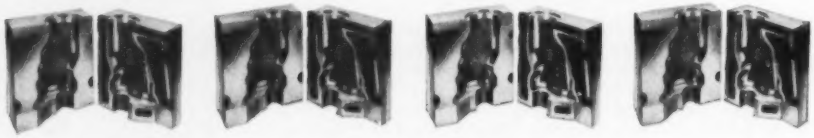
Common household odors can be driven off with a pine-scented pill that is electrically dissipated from a streamlined Plaskon urea case. By simply inserting the pill through the slots of the strong, burn-resistant case, the sweet, clean vapors will automatically be released throughout the entire home. The non-electrostatic unit fits into any AC or DC outlet. It is produced in decorator's ivory by Milwaukee Plastics, Inc., 3070 W. Capitol Drive, Milwaukee 16, Wis.



FOR MOLDS

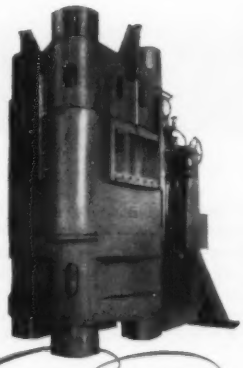


FOR HOBBED CAVITIES



CHOOSE MIDLAND

No matter what your mold requirements may be, you can trust your job to Midland. For here are gathered skilled craftsmen, the country's finest facilities and experience second to *none*. Molds from electrical parts to refrigerator doors, hobbed cavities from toothpaste tube caps to radio cabinets are all within Midland's capacity . . . for here is the world's largest hobbing press, tripling former hobbed cavity limits. But that's not all . . .



FOR SERVICE

you can't beat Midland either. We do our best to meet *your* schedules, don't make you conform to *ours*. And, located in the transportation center of the country we can serve you as well in Maine as in Muncie. Send your prints to Midland. We will be glad to quote . . . without obligation.

HOBBED CAVITIES by MIDLAND

MIDLAND DIE AND ENGRAVING COMPANY

D&E

1800 W. Berenice Avenue • Chicago 13, Illinois

Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stamps • Hobbings • Pantograph Engraving

Engineering Progress in 1952

PLASTICS, more plastics, and still more plastics are being molded, extruded, calendered, formed, fabricated, and made into components and end products by every conceivable method. New materials, better old materials, advances in equipment design and operation, plus an awareness on the part of product designers of the many advantages that can be gained through the use of the proper plastic for their newly conceived or redesigned products have all had much to do with making 1952 the most outstanding year in the history of our industry.

The Materials Supply and Demand section, starting on p. 57 of this issue, pinpoints the increases in consumption of each different material. From the production angle, two examples will serve to symbolize industry-wide expansion: In the latter part of 1952, one large injection molder placed a firm order for about $750,000 worth of large injection machines in order to increase his already very large molding capacity. An Eastern company, which recently developed a unique machine for making reinforced plastics pipe on a continuous basis, has received an order for 100,000 feet of 4-in. pipe which will be used in Texas for water and oil.

Dreams Come True

An article ("What Engineers Want," MODERN PLASTICS, March, 1952) presented the views of a number of typical users of equipment for plastics on the subject of what advances they would like to see engineered into machinery then on the market. Some of these dreams have already become realities. For example, Victor Hauprich of Yardley Plastics, Columbus, Ohio, wanted to see more positive and accurate temperature control instruments for extrusion equipment. In MODERN PLASTICS Magazine, May, 1952, Modern Plastics Machinery Corp., Lodi, N. J., announced just such an instrument.

Another mechanism which was desired had to do with some

(*Continued on p. 186*)

Sprayed Metal Molds

PRODUCTION of low-cost molds by metal spraying techniques involves the following operations: 1) selection of a suitable master model; 2) making the master; 3) preparation of the master surface for metal spraying; 4) mounting the master before spraying; 5) metal spraying onto the master until the desired shell thickness is obtained; 6) removing the sprayed shell from the master; 7) backing up the spray formed shell; 8) mounting the shell for use.

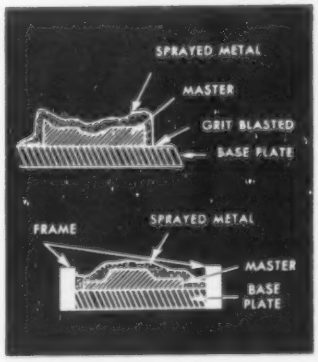
A great variety of materials may be successfully used for the manufacture of the master model. These range from the low-melting point waxes and thermoplastics such as vinyl and acetate through thermosetting casting resins and gypsum cements to low-melting point metal alloys and even machine steel. The one criterion is that a polished smooth surface must be prepared on the master if a similar surface is to be required in the mold.

Although sprayed molten metal is at a relatively high temperature, the actual temperature on the master can be held as low as 150° F. if desired. This is controlled by adopting an intermittent spraying technique along with the periodic application of compressed air or water in order to cool the master.

Before spraying, the master should be mounted on a base which serves to hold it in position during the spraying operation. During the metal spraying the master is impinged upon by extremely small metal globules in the plastic state, which flatten out and interlock, thus forming a continuous though somewhat porous coating.

The recommended process for

Grit blasting or frame mount prevents edges of sprayed metal from curling



* Reg. U.S. Pat. Off.

Typical spraygun used to deposit molten metal directly on a master model

producing sprayed metal coatings utilizes metal in the form of a wire, fed into an acetylene or oxy-hydrogen flame with a variable speed air driven turbine. A complete metallizing installation of this type includes the following items: a) source of compressed air; b) source of fuel gas; c) air and gas control units; d) spray gun plus accessories; e) ventilation equipment; f) metal dust recovery unit (optional).

The selection of the metal to be sprayed has to be made on the basis of the physical properties which are desired for the sprayed form. The physical requirements of the latter should be carefully analyzed, because there is frequently a tendency to overrate them; i.e., to specify strength properties etc. which are not warranted by the mold's service conditions. Wherever possible, metals with low shrinkage should be selected, in order to produce optimum dimensional accuracy and avoid difficulties such as warpage. Metal inserts may be placed in the sprayed metal shell in order to strengthen certain sections of the mold, prevent warpage, form deep cut projections that could otherwise not be made readily, etc.

Although spray formed metal shells can be employed "as is" in some applications, a backing is indicated for the majority of the uses which have been developed or proposed for these low cost metal molds. Depending upon the service requirements of the assembly, a variety of backing materials have been successfully utilized. The construction of a suitable tight fitting frame around the shell is generally the prime requirement for the production of a backing, although more elaborate setups have been found necessary in certain specialized applications.

Backing Materials

Where great strengths are not required, gypsum cements are satisfactory backing material; however, where greater physical strengths are necessary, resin impregnated gypsum cements and resin-gypsum casting slurries are indicated. Very satisfactory backings can be obtained with the use of resinous casting material such as a casting phenolic. A recent development has resulted in the use of polyester-fibrous glass laminates for backing these shells.

The principal applications of sprayed metal shell molds can be found today in the production of molds for reinforced plastics; however, a rapidly expanding application is the use of such molds for sheet forming operations. The excellent reproduction of the master model detail in sprayed metal shell forms has permitted their use in the production of vinyl place mats with intricate designs simulating cloth products, etc.

Slush casting affords another example of the versatility of this type of mold. These and many other uses which have already been successful suggest that other types of molds and dies which are now being produced by other mold forming techniques can now be manufactured by metal spraying.

Complete information on materials, techniques, and equipment for

Operator sprays gypsum cement matrix with metal to produce the mold for a complex aircraft shape. Spraying is continuous until the desired thickness has been achieved

producing sprayed metal molds can be obtained from Metallizing Engineering Co., Inc., Long Island City, New York.

(MODERN PLASTICS, September 1952)

Polyester Pipe

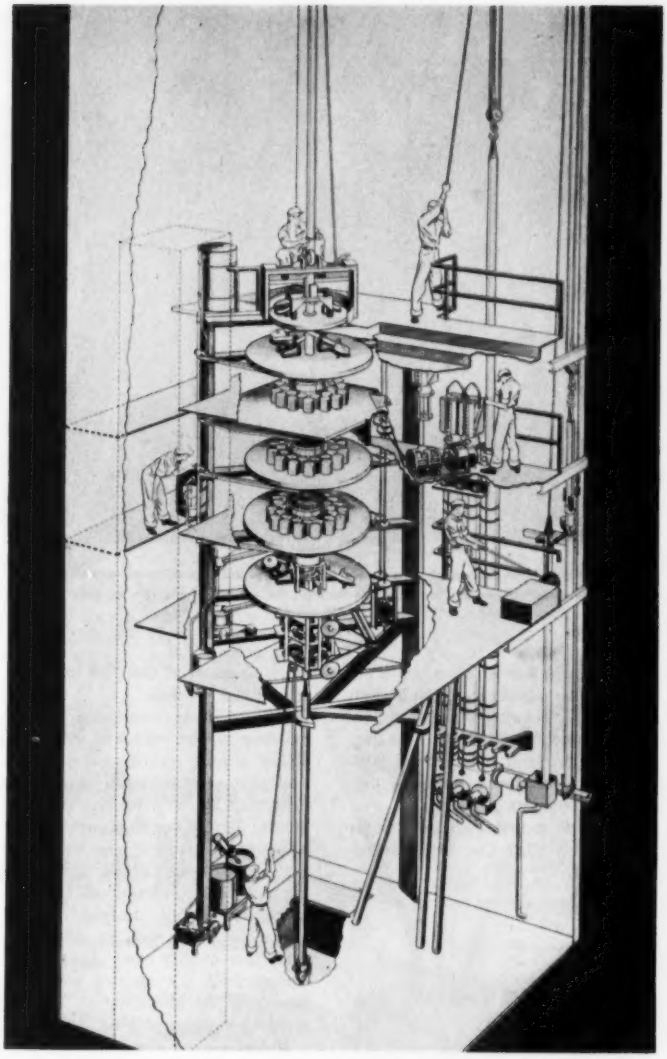
CONTINUOUS production of Fiberglas-polyester pipe is now being accomplished with a new machine and the development of the necessary operating technique.

As now being made, this reinforced plastic pipe is built up of a number of layers. The first or inner layer is composed of one or more thicknesses of Fiberglas tape made from 10 mil surfacing mat bonded together with 22 roving ends per inch. Over this, Fiberglas rovings are spiralled on at a predetermined angle with the following layer consisting of additional sets of rovings spiralled on in the opposite direction. The next layer consists of a number of rovings equally spaced around the circumference of the pipe, but running parallel to its axis. Next, two thicknesses of Fiberglas tape similar to the first inner layer are wound on spirally under considerable tension.

All of these various layers, with the exception of the two outer layers of Fiberglas tape, are thoroughly coated with polyester resin before they are applied. Because the two outer layers of tape are wound under tension, the pressure thus built up forces the resin through the two porous outer layers, resulting in their thorough impregnation. A final layer consists of two overlapping layers of cellophane tape wound around the layup under considerable tension. This serves to exclude air during curing. An additional function of this final wrap is that it squeezes the many layers together and smooths out the outer surface.

Vertical Mandrels

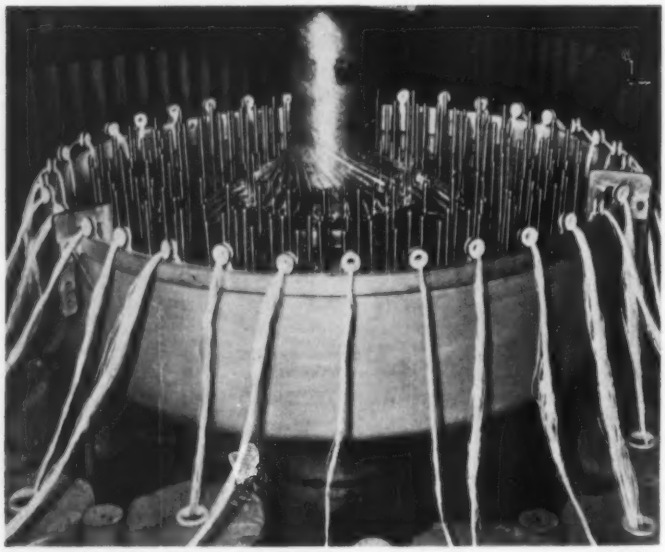
In this new method, the pipe is built up on a succession of vertical mandrels traveling upward through rotating turntables. Pipe lengths are limited only by the length of the mandrels used and the physical capacity of the building which houses the equipment.



Schematic drawing illustrates continuous production of polyester pipe, which is built up on a vertical mandrel traveling upward through a series of rotating turntables

At the lower end of the machine is the mandrel drive mechanism consisting of three sets of four rubber-tired wheels each, one set above the other, arranged so that they push the mandrel steadily upward. Each mandrel is made from a 20-ft. length of mechanical steel tubing, centerless ground to close tolerances, plated with hard chrome, and highly polished.

After a full length of wrapped mandrel emerges from the top of the wrapping and impregnating equipment, an operator cuts through the layers of cellophane and glass. The length of wrapped mandrel is then hoisted into position over the top of a cure pot which consists of an 8 in. diameter tube about 22 ft. long. The mandrel is lowered into the pot and the curing heat is supplied by



In pipe production, wrappings of resin coated glass rovings are applied at an angle to the upward-traveling mandrel as it passes through the second of six circular tables

a circulating hot air system. Since curing time is approximately 30 min., a series of curing pots is required for continuous operation. After curing, the mandrel is removed from the pot and the finished pipe stripped from its surface.

This pipe is manufactured by the Spiral-Glas Pipe Co., New Brunswick, N.J.

(MODERN PLASTICS, June 1952)

Injection Molding of Nylon

MOLDED nylon finds what is perhaps its most important field of application as an engineering material, because of its strength and toughness, form-stability at high temperatures, abrasion-resistance, and unique bearing characteristics. The nylon molding powder most widely used in injection molding is type FM-10001. This formulation has the highest softening temperature of the commercial nylon molding powders. Unless otherwise specified, the molding material referred to in this article is FM-10001.

The basic requirements for nylon molding equipment are: 1) availability of proper range and distribution of heat within the plasticizing cylinder; 2) a properly designed nozzle; 3) dry molding powder with a moisture content less than 0.25 percent. Although nylon is now being molded in conventional injection machines of all designs without alteration, it is well to remember that the quality and dimensional accuracy of the molded piece are governed to some extent by the molding equipment used.

Nylon can be molded at cylinder temperatures of 520 to 720° F. The choice of temperature will be based primarily on the quantity of nylon to be melted and on the cross-section of the article being molded. In many cases, the use of higher molding temperatures improves the toughness of the molded piece and increases the plasticizing capacity of the machine.

Cylinder Types

The term "molding temperature" as used here refers to the maximum temperature within the cylinder. The area over which it is applied depends on the type of machine. The two major types of cylinders, as far as location of heating bands is concerned, are shown in Figs. 1 and 2. The type shown in Fig. 1 (typified by the De Mattia, HPM, Impco, Fellows-Leominster, Reed-Prentice, and Watson-Stillman machines) has no heating band over the course traveled by the plunger. The rear heating zone is at the rear section of the spreader. For this type of cylinder, the highest temperature should be maintained at the rear band (measured at the center of the heater band)—600° F. or hotter, depending on thickness of section, cycle, etc. A temperature about 50 to 150° F. lower is maintained over the front portion of the spreader section. The temperature at the extreme front end of the cylinder should be just high enough to keep the material moving through the nozzle—as low as 400° F. on fast cycles, or as high as 500° F. on slow shots.

In the cylinder design shown in Fig. 2 (exemplified by the Lester and Van Dorn machines), the rear heating zone overlaps a section of the plunger stroke. The rear band of such a cylinder should be heated to only about 450° F. The higher temperature is applied at the main body band. For the front portion of the spreader and the extreme front end of the cylinder, the same general rules apply as for the cylinder in Fig. 1.

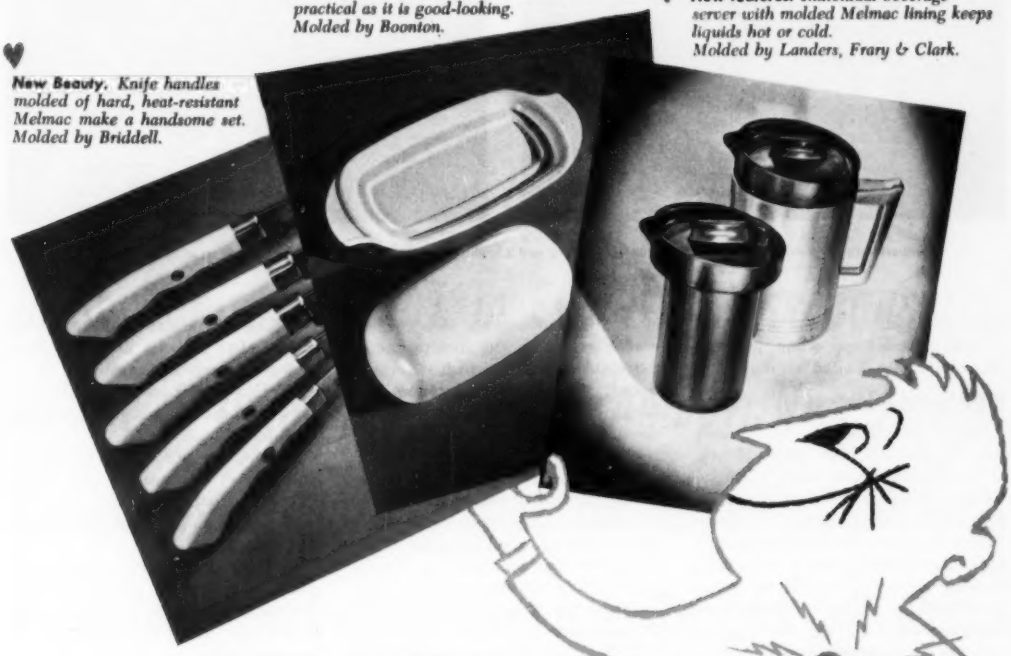
Figure 3 shows a nozzle which was developed in the Du Pont laboratories for molding nylon. Nozzles of this general design can be made to fit all types of machines. A nozzle filter, consisting of a steel plate with drilled holes 1/32 in. in diameter, is recommended. The number of holes should be such that their combined areas will at least equal the cross-sectional area of the nozzle bore. The function of the filter is to prevent unfused particles from entering the mold. The filter is not needed to control drooling. Nor is a filter necessary when molding FM-3001, FM-6501, FM-7001, or FM-8001 nylons, because these materials melt at appreciably lower temperatures than FM-10001 nylon and are more viscous in the molten state.

At least one commercial machine (Lester) is equipped with a nozzle having a mechanical shut-off. This type of nozzle has proved successful in molding nylon; in fact, it offers certain advantages when molding over inserts, or when very hot ma-

New shapes. *Break-resistant Melmac makes a modern butter dish that's as practical as it is good-looking. Molded by Boonton.*

New features. *Individual beverage server with molded Melmac lining keeps liquids hot or cold. Molded by Landers, Frary & Clark.*

New Beauty. *Knife handles molded of hard, heat-resistant Melmac make a handsome set. Molded by Briddell.*



new beauty...
new shapes...new features...
mold them into your new products with Melmac®

Look at the counter-clearing sales advantages you build into your products when you make them of MELMAC molding material:

- *Through and through color* that won't fade, crack, chip, peel, flake.
- *Structural resistance* to breaking, chipping, cracking.
- *Light weight,* with the quality "feel" of much heavier materials.
- *Easy* cleaning, handling, storage.
- *Resistance* to heat, moisture, corrosion.

And you profit from these manufacturing benefits:

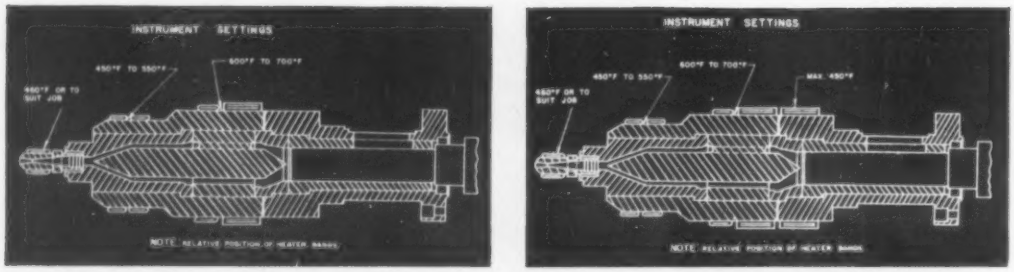
- *Easy molding* in almost any shape.
- *Economies* that go with built-in color.
- *Economies* from elimination of subsequent drilling, tapping, etc.
- *Easy handling, shipping*... lower shipping costs.

Any wonder that more and more manufacturers plan their new numbers with MELMAC in mind?

Write for this free booklet. Find out how 30 leading housewares manufacturers built more "sell" into their products with Cyanamid's plastics. Many of these 30 illustrated case histories may throw new light on *your* problems. Be sure to write for your free copy of "In Housewares Alone . . . 30 More Manufacturers Swing to Cyanamid Plastics."

AMERICAN Cyanamid COMPANY
PLASTICS DEPARTMENT
32 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Royal Bank Building, Toronto, Ontario, Canada



Temperatures for molding nylon are shown in Figs. 1 (left) and 2 (right) for two cylinders that differ in location of heating bands

terial is required at the front end of the cylinder, as when molding extremely thin-walled sections.

High-Speed Injection

Nylon should always be injected into the mold at high speed. Hence, it is recommended that a high-volume pump or "booster" be used. Special mold construction is not required for nylon. Any mold suitable for other thermoplastics is equally satisfactory for nylon. When nylon does flash in molds in which other thermoplastics do not, the flashing can be attributed to more effective pressure within the mold because of the fluidity of the nylon. When flashing occurs, the line pressure should be reduced but the high rate of injection should be maintained.

The accuracy of dimensions in a molded article depends to a considerable extent on the dimensions of the mold cavity in which it is produced. When close tolerances are required, the following mold construction steps are recommended:

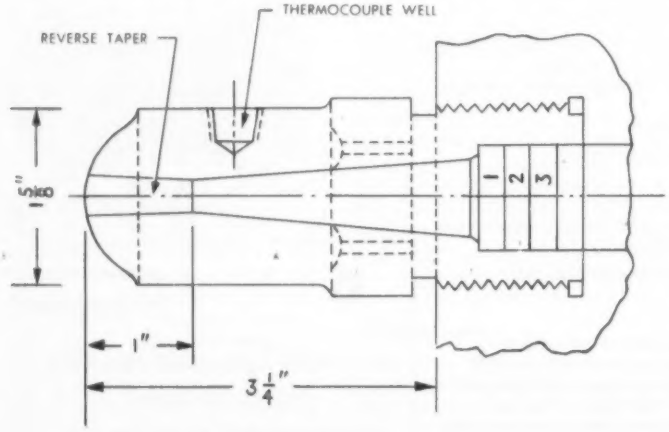
1) Using the specified dimensions, machine a single cavity in the mold-base intended for use in production.

2) Machine the sprue bushing and all runners up to the positions where the production cavities will be inserted. This will establish the time required for the material to reach the cavities.

3) By trial moldings in the single cavity, determine optimum runner and gate size, and determine the best molding conditions required to produce satisfactory parts.

4) Heat-treat the molded part for ½ hr. at 350° F., and cool slowly.

Fig. 3—An injection machine nozzle with a reverse taper bore is recommended for use with nylon. Nozzles of this general design can be adapted to fit all types of machines



5) Check dimensions of the treated article after at least 24 hours. Note changes in any dimension.

6) Use shrinkage data thus obtained to adjust the dimensions of the production mold.

7) Machine production cavities to the correct dimensions, and insert into the production mold base that was used for the single-cavity test molding.

8) Mold under the conditions previously established, without altering the runners. Compensation for slight differences in dimensions can be readily made by altering molding conditions slightly.

In general, the temperature of the mold should be about 100° F. Lower temperatures may be used when extreme toughness in thin sections is desired. Temperatures above 150° F. are seldom necessary.

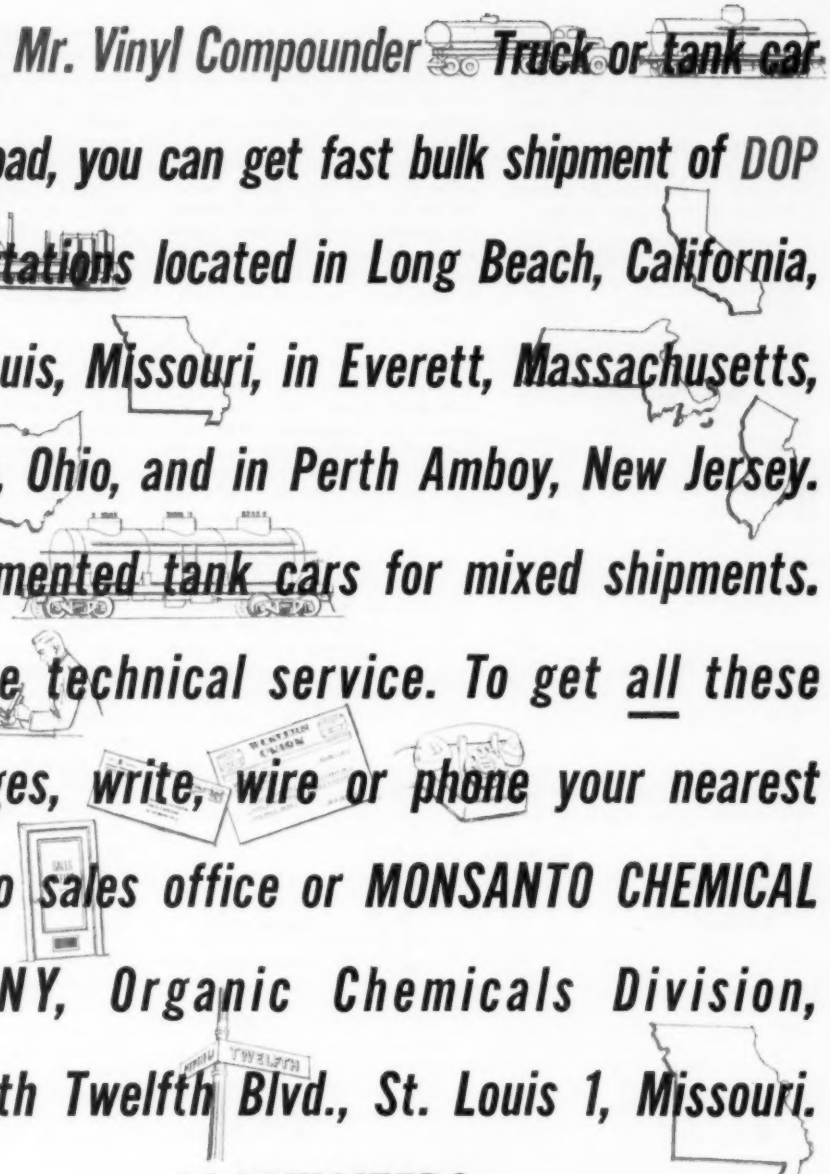
The length of cycle required can be estimated on the basis of one min. per ¼ in. of thickness. Articles with non-uniform cross-sections, in which edges or surfaces must be extremely straight or flat, will usually require much longer cycles.

Heat Treating

It is recommended that heat-treating of molded nylon articles be carried out in the absence of air, preferably by immersion in a suitable liquid. It is recommended that the temperature of this heat-treating liquid be about 350° F. A heat-transfer medium such as Hitec heat transfer salt (Explosives Dept., E. I. du Pont de Nemours Co. Inc., Wilmington, Del.) has been found satisfactory.

The heat-treating bath should be electrically heated and thermostatically controlled and, for good operation, heat should be supplied through the side-walls as well as through

Attention Mr. Vinyl Compounder — ~~*Truck or tank car*~~ *or drumload, you can get fast bulk shipment of DOP from* ~~*5 stations*~~ *located in Long Beach, California, in St. Louis, Missouri, in Everett, Massachusetts, in Akron, Ohio, and in Perth Amboy, New Jersey.* ~~*Compartmented tank cars*~~ *for mixed shipments. Complete technical service. To get* <u>*all*</u> *these advantages, write, wire or phone your nearest Monsanto sales office or MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Missouri.*



PLASTICIZERS

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

the bottom of the vessel. The minimum immersion time required for heat-treating is 10 min. for articles having a wall thickness less than ⅛ inch. Articles of heavier cross-sections may require up to 30 minutes. After the parts are removed from the bath they should be allowed to cool slowly away from drafts.

(MODERN PLASTICS, May 1952)

Extrusion of Nylon

HIGH melting point nylon molding powders have comparatively sharp melting points and low viscosities at melt temperature. These nylons require extrusion barrel temperatures as high as 650° F., and consequently oil-heated extruders have been found to be unsatisfactory. The lower melting point nylons, on the other hand, are more similar to other thermoplastics in their behavior. The design of the barrel and the type of extrusion heating equipment are of utmost importance when the high melting point nylon powders are to be extruded.

The most satisfactory barrel for nylon is a one-piece barrel, which has no flanges, and which is heated by electrical band heaters. These heaters should be controlled by proportioning-type instruments, one to each zone. Two zones are adequate on 2-in. and smaller machines, but larger extruders should have more zones.

Much development work has been done by Du Pont on screw design; it is recommended that complete information on this subject be obtained from the Field Service Lab., Polychemicals Dept., E. I. du Pont de Nemours & Co., Arlington, N. J.

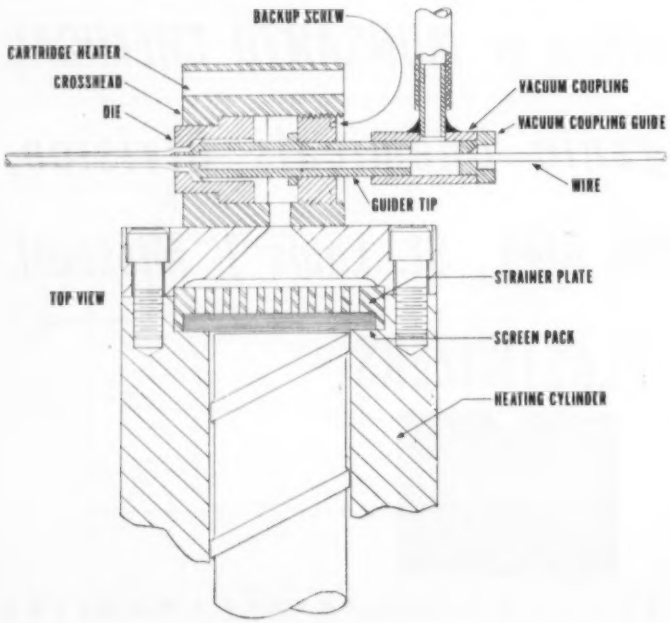
Du Pont nylon molding powders FM-3003, FM-3606, and FM-7001 are used for coating wire. When nylon is applied as a primary insulation, good adhesion between nylon and wire can be obtained by preheating the wire by resistance or radiant heating. Smaller wires can be coated while passing vertically downward into a quench bath. The water level should be raised to within an eighth of an in. or so of the die. For larger wire, or where existing equipment dictates, horizontal operation is best.

Figure 1 illustrates the crosshead and die assembly for coating wire with nylon. Dies similar to the one shown in Fig. 2 are used. The annular space between the guider tip and the die at the point where the molten nylon is extruded upon the wire should have a thickness between five and ten times the desired thickness of the coating on the wire. The thickness of the coating is controlled by correlating the speed of the extruder and the take-up speed of the wire. Between the quench bath and take-up, the wire is generally spark-tested for breaks in the insulation.

The same methods are used for extruding a nylon jacket over a primary insulation, instead of directly on the metal.

Nylon molding powders FM-6503 and FM-6901 have been used extensively for coating cable. These nylons require a long quench bath and sufficient time between extrusion and take-up so that their surface will cease to be tacky. The time required for the surface to set depends on the thickness of the coating and the temperature of extrusion. About 1½ min. is usually required.

Fig. 1—Crosshead and die assembly for coating wire with nylon. Thickness of the coating is controlled by correlating speed of the extruder and take-up speed of the wire



Extrusion of Tubing

Tubing of nylon powders FM-3001 and FM-10001 is produced by the method shown in Fig. 3. Extrusion vertically downward into a water-bath has been successful only when the arrangement is such that water inside the tube is maintained at about the same level as the water outside the tube. Tubing die is the same as the wire-coating die shown in Fig. 2. Diameter and wall thickness are determined by size of die, temperature, speeds of screw and take-up, and amount of air introduced. Tubing of FM-6504 can be produced by the same method, or by more conventional thermoplastic techniques.

Vertically downward extrusion is used to make shapes of nylon molding powders FM-3001 and FM-10001. In this case it is especially important to bring the surface of the

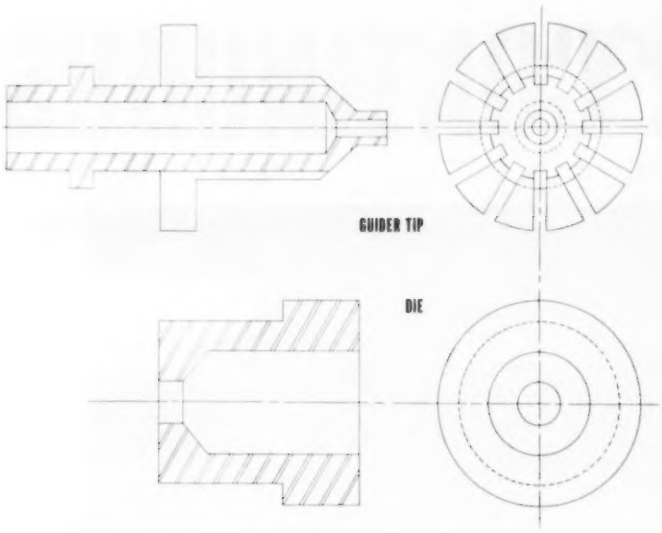


Fig. 2—Drawing of a double-duty die that is applicable for use either in the nylon wire-coating set-up of Fig. 1 or the extrusion of nylon tube illustrated in Fig. 3

quench bath as close to the die as possible, in order to freeze the shape before the fluidity of the nylon permits it to be distorted. Usually the temperature of the die is kept at about 60° F. above the melting point of the nylon until the nylon has started to flow through it. Then the temperature of the die is lowered to a point approximately 10° F. above the melting point of the nylon being extruded.

Die design depends on the shape of the extruded item, but a draw-down of 1.5 to 1 is average. Nylon molding powder FM-6503, although suited to this type of operation, can also be extruded into shapes by more usual methods. All commercial types of nylon molding powder can be extruded as sheeting by using a die developed by Du Pont for this purpose.

Extrusion of Sheet

In extrusion of nylon sheeting, the required elevating starting temperatures and somewhat lower operating temperatures vary widely according to the nylon formulation being extruded. Du Pont has available a chart giving all of these temperatures. Nylon powders FM-3001 and FM-10001, and modifications thereof, are extruded into a water quench bath when producing sheet. The bath must be so arranged that the water level is maintained within $\frac{1}{4}$ in. of the die.

Because of sensitivity to quench water temperature, good circulation is necessary to prevent localized areas of hot water, which will cause streaks and spots on the extruded sheet. At the same time, however, this circulation must not cause impingement of streams of water on the uncooled nylon. The nylon is pulled by a pair of driven rubber rolls. The rate at which these rolls are turning with respect to the rate at which the sheet is extruded will control the caliper.

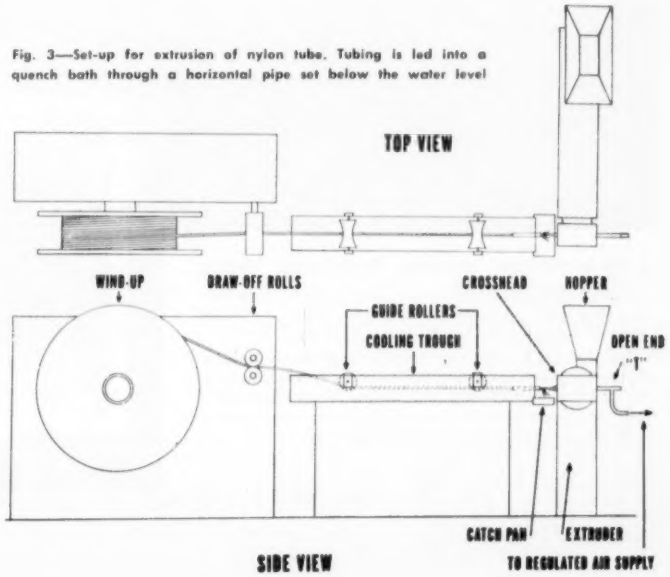
Chill Roll Replaces Bath

The more viscous and slower setting nylon molding powders, such as FM-6503 and FM-6901 and modifications thereof, are extruded downward around a chill roll instead of into a water quench bath. The relationship of the speed of the driven chill roll to that of the extruder determines the caliper.

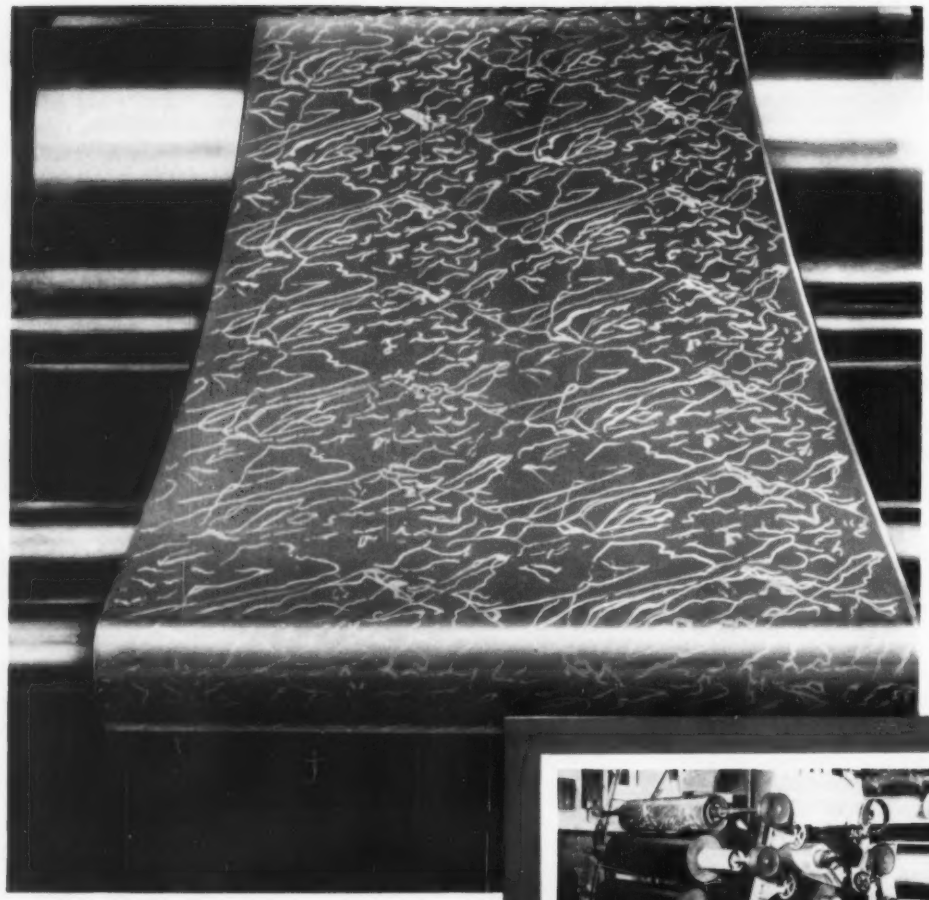
The appearance of bubbles in nylon as it extrudes from the die may be caused by several factors: 1) The nylon may be wet and should be redried. 2) The screw may be of improper design. 3) The nylon may be overheated in which case it will also be discolored. 4) Air may be entrapped in the nylon, which can be eliminated by reducing the screw speed and increasing the fineness of the screens. 5) The die opening may be too large, or the output capacity of the machine is being exceeded. 6) In coating operations, the material being coated may be wet.

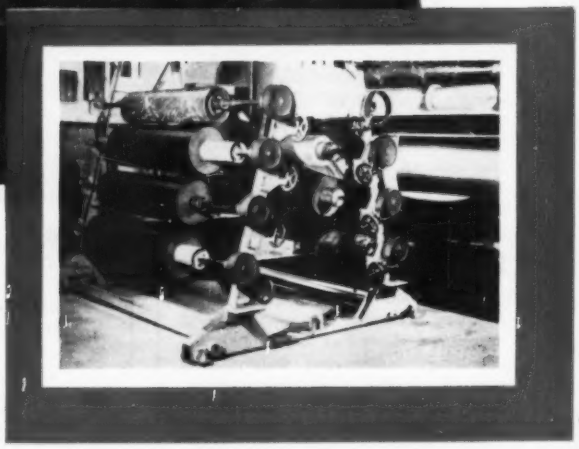
(*Continued on p. 98*)

Fig. 3—Set-up for extrusion of nylon tube. Tubing is led into a quench bath through a horizontal pipe set below the water level



NOW! CONTINUOUS





BWH ROTOCURE producing Vinyl Counter Topping

Finished laminated counter top issues from the Rotocure in a long continuous strip. Material, of course, can be slit into any width rolls on the Rotocure if desired.

To produce the counter top, above, several individual calendered plies are fed into Rotocure for continuous lamination (as shown at right). This six-ply set up consists of a clear film for the wearing surface, a printed vinyl surface, and four backing plies of a highly filled vinyl.

LAMINATED PLASTICS

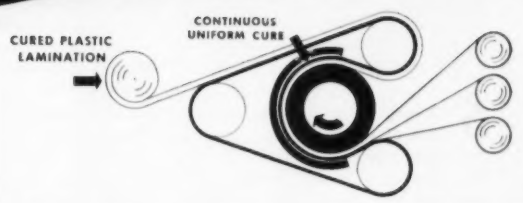
Any Length... Yes Any Length!

UP TO 1" thick 72" wide

Here's a New Way to Cut Your Costs . . . BY USING THE BWH ROTOCURE PROCESS

BWH was the first to do it with rubber. Now BWH is the first to do it with plastics . . . laminated plastics in any lengths you want . . . uniformly cured and rolled in one long piece by the famous BWH Rotocure Process.

Look into the possibilities of continuous laminated plastics. They could be the answer to many of your problems. They could be the means of cutting both your raw material and fabricating costs.



HOW THE ROTOCURE OPERATES

This schematic layout illustrates the principle of the Rotocure's operation. A line contact pressure of 100,000 pounds is exerted at the point where the pressure roll meets the curing roll, and pressure is maintained during the entire travel of the material on the curing roll by an endless steel belt. Heat is applied by the curing roll, as well as from the shoes riding on the metal belt which is in tension against it.

With its famous Rotocure Process, long used by BWH in making laminated rubber, BWH is now producing laminated plastics in continuous, *more economical runs*. It's a process that involves no costly lost time . . . opening, reloading, unloading and closing . . . as in the case with flat press lamination. It's a process that eliminates all limitations as to length of any sheet. And the stock peels off an endless polished belt with a high surface finish.

Highly flexible in operation, the Rotocure Process permits BWH to weld a number of plies up to 1" thick and 72" wide . . . with or without embossing . . . at any required speed and with temperatures as high as 340°F and pressures up to 60 p. s. i.

Leading companies are already switching to continuous laminated plastics because of the savings in cost they offer. Full particulars on the possibility of BWH producing your stock by continuous lamination will be supplied at your request. Write today.

Partial list of materials laminated on BWH ROTOCURES

Flexible vinyls — Polyesters
Rigid vinyls — Copolymers

The above vinyls can also be laminated with the following materials

Natural and synthetic fibre cloths — Aluminum foil
Woven glass cloth — Plain and printed papers

Typical products that can be produced more economically with continuous laminated plastics

Desk and counter top material · Synthetic leather
Shoe soling · Record preforms · Flooring
Luggage materials · Upholstery material · Stair treads

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

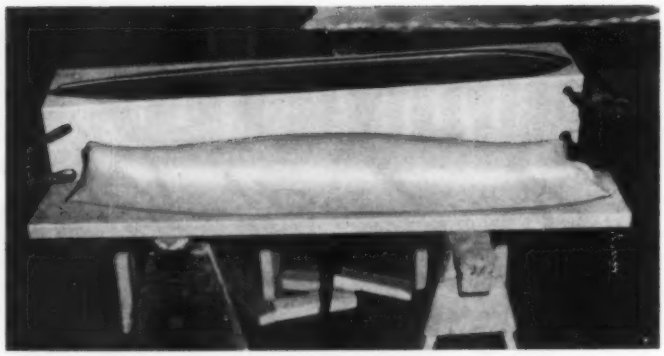
CAMBRIDGE, MASS. · P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BWH

Variation in flow or surging may be the result of a number of factors: 1) improper screw design; 2) excessive screw speed; 3) improper crosshead; 4) a cold spot in the barrel as the result of a burned-out heater band; or 5) incorrect temperature settings.

Two ways are recommended to clean nylon from the screw, breaker plate, crosshead, and dies. In a plant where long production runs are normal practice, parts are frequently cleaned by blow torch and wire brush but a molten salt bath is usually preferred.

(MODERN PLASTICS, August 1952)



Balloon shaped to contours of model boat mold is formed from latex sprayed into mold; latex-coated board is cemented to edges of balloon and entire unit removed

Testing Models

SHIP and plane models formerly made of wood or wax are now being produced experimentally of a Fiberglas cloth and polyester laminate at the David Taylor Model Basin, Washington, D.C. The following advantages over wood or paraffin models have become apparent: The models are lighter and thus are easy to handle, yet in most cases they are stronger than other types. This added strength is a special advantage for aircraft models which will be used in high velocity wind tunnel tests. More room is left inside the model for instruments, since the polyester-glass hull or shell is much thinner than in either wood or wax models. The plastic models can be ballasted much more accurately than other kinds, and color can be added to the bonding resin, thereby eliminating at least one or more coats of paint. This coloring will not dull or fade as will paint. The plastic models pick up much less moisture from the air and water.

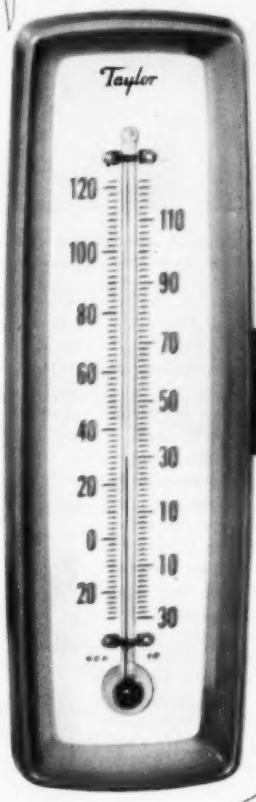
It is often desirable to modify a model after it has been tested and it was found that the Fiberglas-polyester models are much more simply modified. It is necessary only to alter the original pattern and mold, and remove from the model the section that is to be altered. The model is then placed in the altered mold, and the added section is built up with impregnated glass cloth or mat, after which the curing process proceeds in normal manner. The new section becomes an integral part of the original model.

When a number of identical models are required, a great saving in the cost of each model is made, since the mold and its appurtenances can be used many times.

After layers of tailored Fiberglas cloth have been laid in mold, the mounted balloon is replaced over the mold and expanded by air pressure into contact with the cloth

Model Patterns

An accurate pattern is first made of the model to be studied. This pattern is lacquered and then given a high wax polish. The waxed pattern is then coated to a thickness of 1/32 to 1/8 in., according to strength requirements, with either an epoxy resin or a sprayed metal mixture of 50% tin and 50% bismuth. This coated pattern is suspended in a box which is then filled with Hydrocal B-11 (U. S. Gypsum Co., Chicago, Ill.) mixed with water. Upon hard-



Outdoor window thermometer manufactured by Taylor Instrument Companies, Rochester, N. Y. Tenite case and back plate molded by Norton Laboratories, Inc., Lockport, N. Y.

weather wise

Lustrous Tenite provides attractive, weather-resistant housing for a modern-design outdoor window thermometer—and makes it easy to read even at a distance.

Molded in two lightweight parts, the tough housing consists of a chipproof aqua-green case and a translucent white back plate. Outdoor light shining through the translucent back silhouettes scale markings and red liquid column in bold relief. Molded projections on back plate permit quick mounting on an adjustable stainless steel bracket.

Tenite is also used today to house telephones, tools, and many familiar household appliances. A versatile plastic, Tenite offers durability and lasting finish—in thousands of eye-appealing color effects—and can be molded or extruded to design specifications.

For more information about the properties and many uses of Tenite, write Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.

TENITE

an Eastman plastic

●Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Houston, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

Balloon is deflated and, together with attached board, is taken off the mold; model boat hull, which has been cured for 24 hr. under pressure, is then removed for finishing

ening, the Hydrocal serves as a backing for the resin or metal shell mold after the pattern has been removed.

Next step is to spray or brush liquid latex into the mold until a layer about 1/32 in. in thickness is built up. A board large enough to cover the mold is sprayed or brushed with latex, and cemented to the edges of the latex coating in the mold. A valve is then inserted in the board in such a way that when air or hydraulic pressure is applied to this valve the 1/32 in. thick latex coating in the mold, which is actually a rubber balloon shaped to the size and contours of the mold, will be inflated. The board with rubber balloon attached is then removed from the mold.

A lay-up of Fiberglas cloth impregnated with catalyzed resin is then made up in the female mold with additional layers inserted to build up a thickness of 1/32 to 1/4 in. after molding. The board with the attached balloon is then placed in position on top of the mold and, using several clamps, is securely fastened in place.

Air pressure applied to the balloon makes it expand, thus forcing the lay-up against the female mold with uniform pressure at all points. The cure is completed in approximately 24 hours by the exothermic heat created by the resin-catalyst mixture. The model is then taken from the mold, the surplus material at the parting line removed either by sanding, filing, or sawing, the surface is highly polished, and cover plates are added. Transparent acrylic decks are sometimes used and other appendages are installed as required.

The David Taylor Model Basin wishes it to be known that all of its methods and techniques used for making plastic models may be seen at the model basin, and parties interested in the process should contact the Director, David Taylor Model Basin, U. S. Navy, Washington 7, D.C.

(MODERN PLASTICS, November 1952)

Polyethylene Carboys

UNTIL just recently, the only practical method for producing large containers made of polyethylene was by fabricating them from sheet stock, since molding equipment of sufficient size to blow mold large amounts of material had never been constructed.

Some months ago, Pirelli A. E. S., Monza, Italy, produced equipment for this work. The first machine

Removing 14-gal. blow molded carboy from its mold. Complete cycle for production is approximately 5 min. and necessitates extruder output of 120 lb. of material per hour

Need Low-Temperature Flexibility in Your Plastic and Rubber Products?

TAKE A LOOK AT THESE POUR POINTS!*

FLEXOL plasticizer 4GO Brand
(Polyethylene Glycol Di [2-Ethylhexoate])
-67.0°F.
. . . An excellent low-temperature plasticizer for the vinyl chloride resins and synthetic rubbers. Rubber stocks containing 4GO have high tensile strength, high elongation, and good resilience.

FLEXOL plasticizer 3GO Brand
(Triethylene Glycol Di [2-Ethylhexoate])
-74.2°F.
. . . An outstanding plasticizer for neoprene. 3GO is also an effective processing aid in compounding perbunan types of synthetic rubber.

FLEXOL plasticizer TOF Brand
(Tri [2-Ethylhexyl] Phosphate)
-101.2°F.
. . . TOF is a recognized standard where *extra* low-temperature flexibility is required. Brittle points as low as –70°C. in vinyl compounds are common with this plasticizer. TOF combines in a single low-temperature plasticizer:

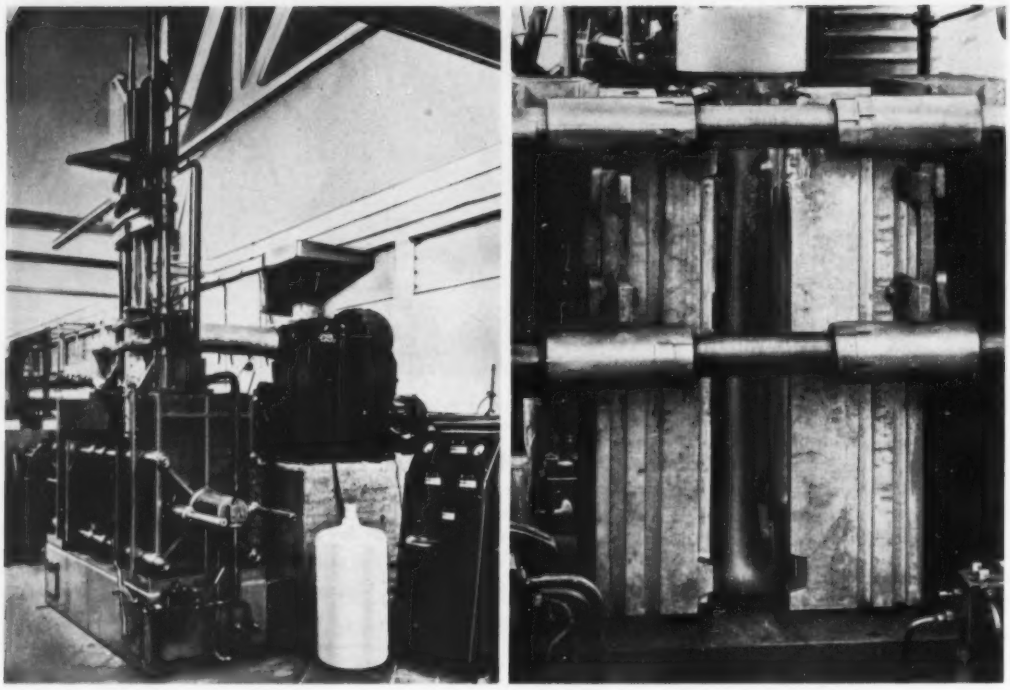
- Compatibility
- Water resistance (an excellent plasticizer for vinyl garden hose)
- Flame resistance—vinyls plasticized with TOF will not support combustion

** Temperature at which the viscosity of a plasticizer is approx. 50,000 centistokes. Low pour points are indicative of good low-temperature properties.*

CARBIDE AND CARBON CHEMICALS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

Production of vinyl plastic and rubber products for military use has made low-temperature properties more important than ever before. FLEXOL *plasticizers offer a range of low-temperature properties in combination with a wide choice of other basic properties. For more specific information, write on your company stationery or call any Carbide and Carbon office for our new 76-page* FLEXOL *Plasticizers Catalog (ask for F-5882).*

"Flexol" is a registered trade-mark of Union Carbide and Carbon Corporation.



Equipment for blow molding polyethylene carboys and (right) parison in mold just prior to mold closing and blowing

consisted of a horizontal extruder for pre-plasticizing the material, feeding directly into a vertical-acting injection cylinder. In addition to these components a horizontal-acting mold clamp was included, all elements being assembled on a steel frame.

In essence, the difference between this method of blow molding and that used to produce the small squeezeable bottles is that the parison is formed in the open air by injecting the plasticized polyethylene through a suitable orifice instead of being formed in a closed mold.

If the cycle is started at the time the parison is in the atmosphere, the steps are as follows: The hydraulic pressure is removed from the injection ram. With this pressure removed, the pressure exerted by the screw in the extruder enables it to force the plasticized material into the injection chamber. As this material continues to flow into the chamber, it forces the injection ram upward. This continues until the injection cylinder is filled with the required amount of the plasticized polyethylene.

While this portion of the cycle is proceeding, the two mold halves automatically close, and pinch the lower portion of the tubular parison. Air pressure at 60 p.s.i. is then blown through a duct located in the central mandrel of the orifice on the injection chamber. This air pressure inflates the hollow parison, causing it to expand until it reaches the inner walls of the die. From 3 to 4 min. are then required for cooling and solidification of the polyethylene. After this time has elapsed, the mold is opened by the operator and the blown carboy is manually removed.

Of course, all during this cooling period the extruder has been operating to refill the injection chamber with plasticized polyethylene, in readiness for the next shot. The complete cycle for producing a 14 gal. carboy is approximately 5 minutes.

After the success of this first equipment was proved, Plax Corp. purchased from Pirelli and now has installed at its plant at Hartford, Conn., this special type of blow molding equipment, where the large capacity carboys are now being produced.

(MODERN PLASTICS, July 1952)

High Vacuum Metallizing

A TYPICAL set-up for a complete production system for high vacuum metallization of plastic items is shown in Fig. 1. Throughout the operation, work is carried on riser rods, which are lengths of square steel stock with slots milled on two opposite sides. Spring clips positioned in these slots hold individual pieces of work.

The three major steps in vacuum metallizing are: 1) applying lacquer undercoat; 2) evaporating the metal

MUEHLSTEIN

specialists in *Reprocessed* plastics

If you use reprocessed plastics, or sell your plastic scrap or have it reprocessed on a contract basis—you can rely on MUEHLSTEIN for superior service, quality and technical "know-how."

MUEHLSTEIN specializes in reprocessed plastics. Their technical staff is at your service.

Further information and samples on request.

all types of virgin and scrap THERMOPLASTICS bought and sold

H. MUEHLSTEIN & CO. INC.

60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis

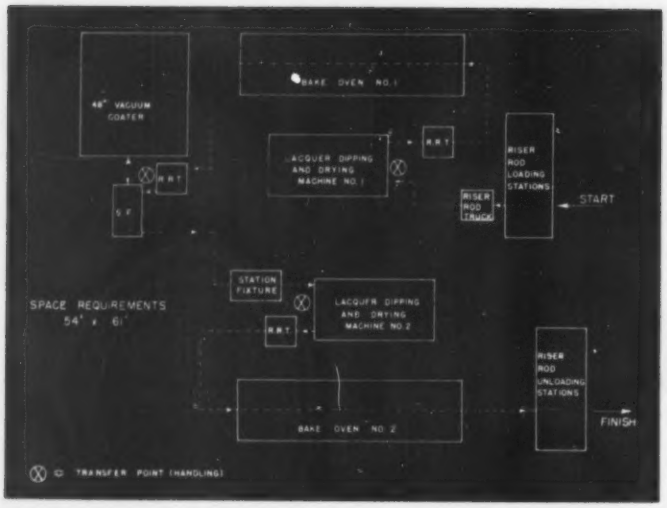
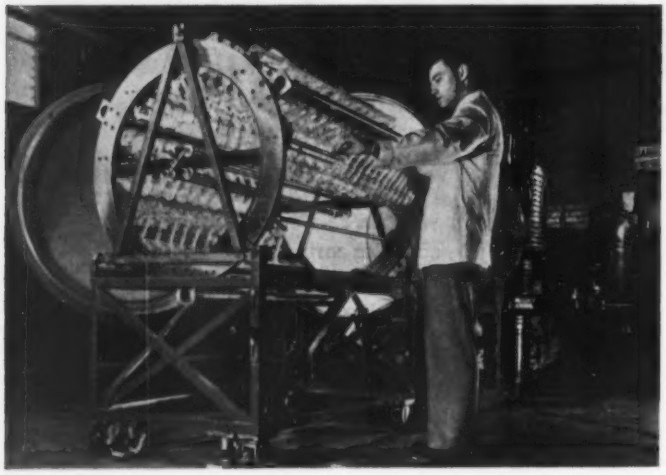


Fig. 1 (above): Set-up for metallization of plastics objects. Dotted lines trace course of pieces through various steps. Fig. 2 (below): Parts, after undercoating, are attached to riser rods which are placed in holding fixture ready for vacuum chamber



film on the undercoat; and 3) providing a protective lacquer coating over the metal film.

After the riser rods are loaded with plastics parts to be plated, they are placed on a chain conveyor which carries them through a lacquer bath and thence into an oven tunnel where preliminary drying to a tack-free condition occurs. As the riser rods emerge from the oven they are loaded on a riser rod truck which is moved into an oven for final drying of the undercoat.

The riser rods are then transferred to station holding fixtures (Fig. 2) which are arranged to be rotated so that all sides of the objects on the rods are exposed to the evaporation source assembly, which is at the center of the fixture.

The fixture is then rolled into the vacuum chamber, the rotating mechanism is connected through a clutch and shaft to a motor outside the vacuum chamber, and the evaporation source assembly is connected to electrical terminals in the chamber. After the door of the chamber is closed, the pumping cycle is started. Metal evaporation commences after the pressure is reduced to 1/1,400,000 of an atmosphere. The fixture is rotated prior to, during, and for a short time after the evaporation portion of the cycle. Air is then admitted to the chamber and the fixture with its load of metallized objects is removed.

The riser rod is once again loaded on a chain conveyor and passed through a second lacquer bath which applies the protective top coat. Final baking then takes place, after which parts are removed from the riser rods and the sequence is repeated.

The production rate for such a system naturally depends on the dimensions and shape of the objects being coated. As an example, a small airplane approximately 4 in. long with a 4-in. wing spread can be metallized at the rate of 1250 per hour on a 15-min. cycle.

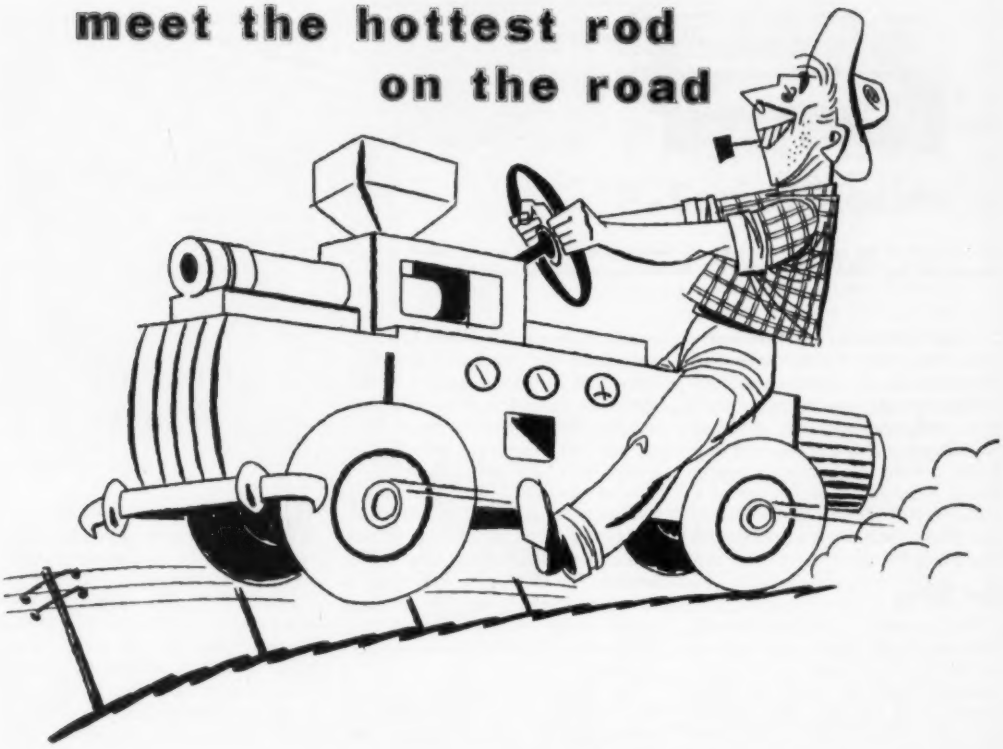
(MODERN PLASTICS, October 1952)

Automatic Machining

AIR powered equipment as a component in machine design and in machine change-over has been an important factor in the development of many ingenious devices for mechanizing standard finishing equipment. As a result of several years development work by I. L. Straub of Synthane Corp., Oaks, Pa., well over 100 of the companies fabricating machines are equipped with "controlled air-power" devices, the heart of each one being a Bellows Air Motor and Hydro-Check (Fig. 1). The principle of using the air motor and hydro-check as an automatic timer is quite simple. The advancing stroke of the air motor piston contacts and actuates any required number of Micro-switches spaced along a slotted guide at various distances, depending upon the time elements involved.

The rate of travel of the air motor piston is always under precise control, first by a separate air pressure regulator, second by the built-

meet the hottest rod on the road



This molder is going places faster'n jet propulsion. He'll give you the things you want tomorrow yesterday. For a quarter, he'll mold you the pieces everyone else wants a buck for. Hasn't he got the souped-up rig with all the latest wing-dings? Doesn't he use dubl-duty super-octane molding powder?

Only what happens *to your job* when this fresh freshman winds up wound up around a telephone pole he didn't even know was there . . . And the old reliable molder who said it would take a little longer and cost a bit more, knowing every curve and angle in the road, goes chug-chugging along and delivers the goods, at *half* the speed but *twice* as fast . . . By the way, our middle name is "Old Reliable."

BOONTON MOLDING CO.

BOONTON, NEW JERSEY

NEW YORK OFFICE — CHANIN BUILDING, 122 EAST 42ND STREET, MURRAY HILL 6-8540

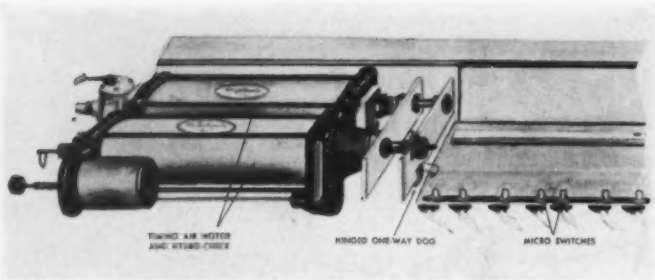


Fig. 1—Heart of the equipment for automatic machining of laminates centers around air-powered units which serve as timers in the actuation of suitably spaced switches

in speed controls in the Electroaire valve, and third by the controlled resistance of the hydro-check.

One example of a large production machining operation involved the milling of a slot in the head of a textile bobbin. A completely mechanized setup based on the use of a Bellows Air Motor, Hydro-Check, and Micro-switches is illustrated in Fig. 2 and Fig. 3.

Slot Milling

The procedure involves manual clamping of the textile bobbin head in position by a hand clamp, after which the operator presses the start button. This energizes the advance side of the Electroaire valve of the BEM 1-120 Air Motor used to time all operations. The air motor advances, tripping Micro-switch No. 1, energizing the advance side of the BEM 5-25 Air Motor used to power the cross slide. The cross slide advances. Almost simultaneously the timing air motor trips Micro-switch No. 2, energizing the advance side of the BEM 5-60 Air Motor powering the carriage. The carriage brings the part up quickly to the end cutter at the center hole of the bobbin. The cross slide continues to advance, feeding the part to the cutter under close control of the Hydro-Check, milling one half of the slot.

The timing air motor then continues to advance, tripping Micro-switch No. 3 energizing the retract side of the BEM-25 Air Motor, reversing the cross slide and milling the other half of the slot. The reverse feeding rate is controlled by a second Hydro-Check mounted on the opposite side of the cross slide. The timing air motor trips Micro-switch No. 4, reversing the carriage, and Micro-switch No. 5 which reverses the timing air motor BEM 1-120. The unit is then ready for the next cycle.

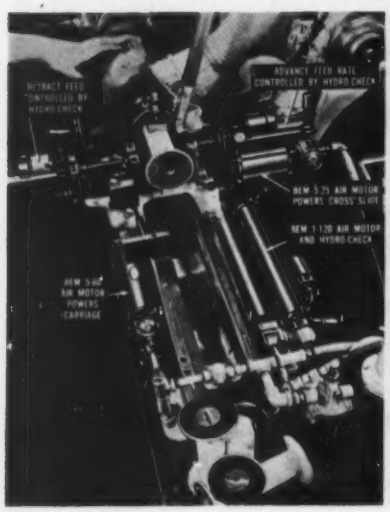
This is but one example of many different complicated machine jobs which have been completely mechanized by this system.

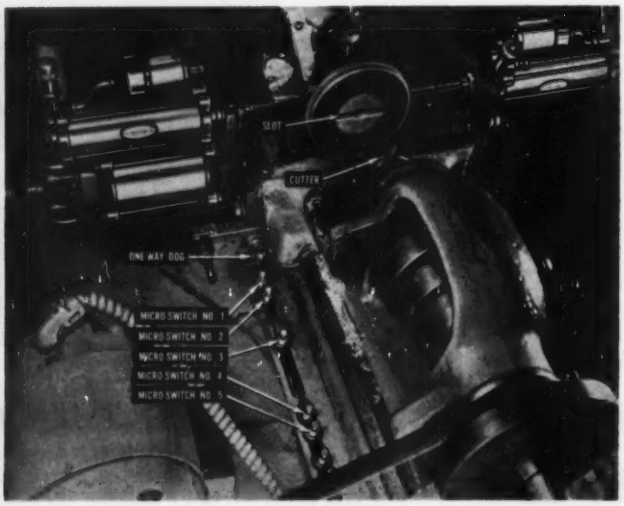
(MODERN PLASTICS, October 1952)

Finishing Machine

WITH relatively simple adjustments a new German-engineered machine can apply five different finishes to plastics films. This machine, designed and built by Dornbusch Co., Germany, and being distributed by F. A. Ringler Co., New York, N.Y., will handle plastics films up to 62 in. wide. The different finishes of which it is capable are single color printing (either gravure or letter press); wipe-shading; coating or lacquering; and the

Fig. 2 (left, below) and Fig. 3 (right, below) show mechanized arrangement for milling slot in head of a textile bobbin


RETRACT FEED CONTROLLED BY HYDRO CHECK
ADVANCE FEED RATE CONTROLLED BY HYDRO CHECK
BEM 5-25 AIR MOTOR POWERS CROSS SLIDE
BEM 1-120 AIR MOTOR AND HYDRO CHECK
BEM 5-60 AIR MOTOR POWERS CARRIAGE



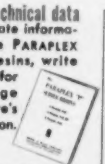
If your problem is here, it's no problem at all with

PARAPLEX
P-Series Resins

All of these products, and many more, are easy to make with PARAPLEX P-Series polyester resins. For ease of handling has been our first aim in producing them. As a manufacturer of reinforced plastics, you'll appreciate their excellent flow and fast cure, and the ease with which they can be pigmented and filled. You'll like the uniformity of your production when you use them.

Your customers, too, will benefit when you use PARAPLEX P-Series resins. Performance characteristics are equally satisfactory. Reinforced plastics based on PARAPLEX P-Series resins have the optimum combination of physical properties: high impact strength; high strength-weight ratios; resistance to temperature extremes; the ability to withstand corrosive chemicals; abrasion resistance; and good electrical properties.

Send for technical data
For up-to-date information on the PARAPLEX P-Series resins, write Dept. RP-1 for our 21-page manual. There's no obligation.



1. Laminated table-tops, 2. Corrugated panels, 3. Pipe, 4. Radomes and other aircraft parts, 5. Boats, 6. Fishing rods, 7. Chairs, 8. Tanks, 9. Trays, 10. Luggage, 11. Helmets.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

PARAPLEX *is a trade-mark, Reg. U. S. Pat. Off and in principal foreign countries.*

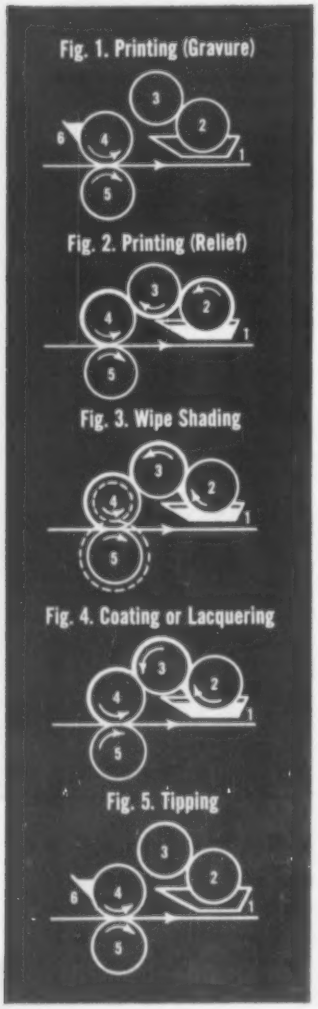
color tipping of embossed stock.

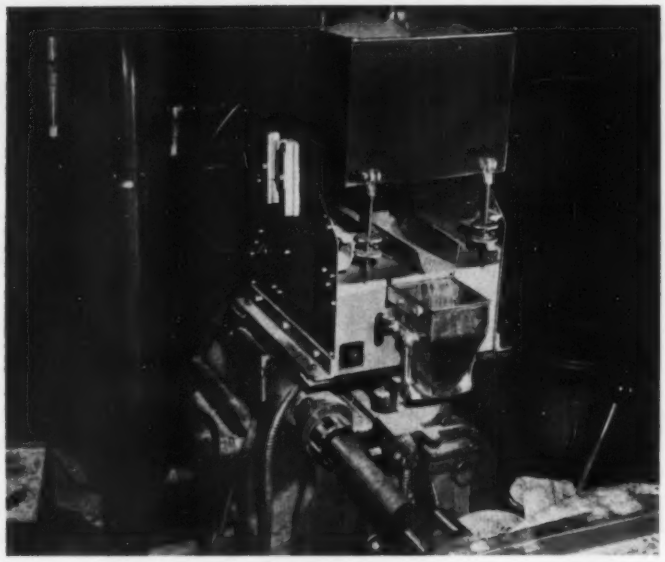
It is supplied as a complete package, with motor, variable speed transmission, and complement of necessary accessory rolls. Standard equipment includes let-off and rewind for handling continous film, but also available are feed and pick-up tables for handling sheeted stock.

Running speeds of the machine are adjustable according to the stock to be finished and the process being employed. The variable speed transmission permits synchronization with embossing equipment, either before embossing operation or after. Speed is infinitely variable from 4 to 26 yd. per minute.

(MODERN PLASTICS, November 1952)

Schematic diagrams of component parts of film finishing machine, showing how they are linked. Numbered parts are as follows: 1) color fountain; 2) pick-up roll; 3) furnisher roll; 4) printing or applicator roll; 5) counter roll; and 6) doctor blade assembly





In weigh feeding technique for injection molding, material from supply hopper goes through vibratory feeder to weigh bucket mounted on a beam. Unit replaces usual hopper

Weigh Feeding

ONE method of holding softened plastic in the mold while the gate is solidifying, without packing in more than is required to completely fill the mold, is to use the weigh-feed method. With this method, only the exact amount of material required to completely fill out the mold is fed into the injection chamber at each shot. Volumetric feeding is not sufficiently accurate, according to Gordon B. Thayer, Dow Chemical Co., Midland, Mich., who recommends weigh-feeding.

The Glengarry Equipment Corp., Bay Shore, N.Y., has recently developed a precision charging unit which makes use of the weigh-feeding principle. It is adaptable to most injection machines, and is installed on the machine in place of the normal material hopper. It is made up of four basic elements: a supply hopper, an electrical vibratory feeder, a weigh bucket mounted on a beam, and an automatically operated gate or door on the weigh bucket. In operation, the feeder uniformly conveys the material from the supply hopper to the weigh bucket. When the weigh bucket has received a predetermined weight of material, it causes a slight movement of the beam, which cuts off the current to the feeder, thus stopping the flow of material. At the proper time in the molding cycle, the gate on the weigh bucket is automatically opened and the accurately weighed charge of material drops into the injection chamber. The entire cycle is synchronized with that of the molding machine.

This charging unit is adjustable over a range from ½ oz. to 80 oz. per charge, and the company states that larger capacities are available upon special order. Its accuracy is reported to be within the range of a few grams.

(MODERN PLASTICS, November 1952)

Machines for Thermoplastics

THE plastics machinery builders had a good year in 1952—far better than 1951—even though they were held back by steel shortages, strikes, and scarcity of skilled help. From all indications 1953 should be even better than 1952.

The shipments of injection machines for 1952 were up by approximately 35% over 1951. While it is true that extruder shipments were approximately the same as those in 1951, it is also true that this particular branch of the machine industry was the one most adversely affected by shortages and strikes. As a matter of fact, one of the larger extruder manufacturers was completely shut down for over three months.

The figures in Table I, covering 1949 through 1952, include machines of all capacities from 1 oz. up to 300 ounces. If the reader should make a comparison between the totals shown in this issue of MODERN PLASTICS Magazine and those given in 1950, 1951, and 1952, he will notice a marked difference in the figures.

This has been brought about because statistics for those years were based on the premise that machines with capacities from 1 to 2½ oz. were not used for production. It has been brought forcibly to our attention that this premise is erroneous. It has been proven beyond doubt that the majority of machines of these capacities are actually production machines. Of course, a very small number are used in laboratories for development work; at the same time, it is also well known that machines of 4-, 8-, 16-, and even 48-oz. capacities are installed in laboratories.

Accordingly, the figures listed for "Machines in the Industry" in Table I have been completely revised and now present a realistic picture of the size of the injection molding industry in the United States. In addition to the figures given here, the reader must always remember that there are a sizable number of injection machines in operation which have been engineered and constructed by molders; because no accurate count can be made of these machines, they are not included in the over-all figures.

A conservative estimate, however, would indicate that there are from five to six hundred of such "custom built" machines in operation. For example, one company has over one hundred injection machines with capacities varying from a few ounces up to 300 oz. and it is of interest that this company has at least five of the 300-oz. class. Another company has several medium size machines up to approximately 48 oz. capacity and in addition has one giant unit with a rated capacity of 330 ounces. Still another company has well over fifty "custom built" machines, practically all of them being run on a fully automatic basis.

The domestic shipments of injection machines for 1952, broken down according to capacities, are as follows:

Capacity in ounces	*Number shipped*
Up to 2½	231
3-4-6	249
8-9-10	111
12-16	107
20-24-28	31
30-32	16
48-50	10
60 and over	9

The export shipments of injection machines for 1952, broken down according to capacities, are as follows:

Capacity in ounces	*Number shipped*
Up to 2½	33
3-4-6	28
8-9-10	36
12-16 and up	2

The domestic shipments of extrusion machines (including twin-screw types) for 1952, broken down into sizes according to screw diameters are as follows:

Screw size (in.)	*Number shipped*
Up to 1½	90
2-3	177
3-4	119
4-5	78
5-6	18
Above 6	5

The total export shipments of extrusion machines for 1952, broken down into sizes according to screw diameters are as follows:

Screw size (in.)	*Number shipped*
Up to 1½	17
2-3	58
3-4	46
4-8	16

Table I—Machines in Use and Delivered

Injection Machines

	1948	*1949*	*1950*	*1951*	*1952*
Machines in the Industry	4102	4814	5683	6251	7015
Machines Delivered in Year		712	869	568	764

Extrusion Machines

	1948	*1949*	*1950*	*1951*	*1952*
Machines in the Industry	1641	1987	2307	2792	3279
Machines Delivered in Year		346	320	485	487

WHEN NEEDED . . . a specialist!

No machine has ever been invented to take over this job. Here, a man is needed—a specialist.

Many a fine product, too, misses success because *the* man was missing—*the* specialist. At Marblette you'll find one of America's most versatile group of specialists in plastics. And around these men, in the last 22 years, Marblette has built up the special equipment specialists must have. In no other way would it have become possible to give you the special formulation in each liquid phenolic resin necessary to meet *your* special production requirements . . . and to meet also the special functional needs of *your* product and to solve *your* special marketing problems.

Marblette's liquid phenolic resins are the thermo-setting plastics which can be set either by heat or at room temperature. Among other properties, they are weather-proof, solvent-proof, fungi-proof; resistant to abrasion, heat and temperature.

Let Marblette's experience over the last quarter of a century help you in solving *your* liquid phenolic resin needs—whether it be in drums or tank car quantities. Our plant and offices are strategically located to serve you promptly anywhere in the United States. Write "Marblette Engineering" to analyze and prepare samples for you of the one phenolic resin best suited to *your* special needs.

MARBLETTE

37-21 30th St. • Long Island City, New York • ST 4-8100
CHICAGO • LOS ANGELES • TORONTO • HAVANA

liquid phenolic resins

Casting resins for dies and tools • Heat and acid resistant resins • Bonding resins • Metal coating • Insulating varnish
Bristle setting cement • Laminating varnish • Wood coating • Plastic cements • Sealing resins • Resin foundry core binders

The Year 1952 in Review

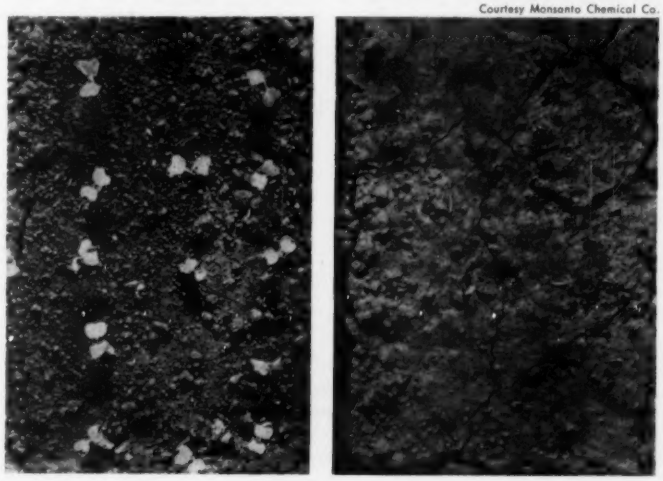
THE growing impact of plastics on practically every segment of industry was highlighted in a survey of the nation's resources and production prepared by the Paley Commission (1)[1]. This group reported that "various industry estimates for the growth of plastics production indicate a likely figure of about 22 billion lb. by 1975 or 10 times current production. This is fairly close to an estimate of the Stanford Research Institute of 25 billion lb. for 1975 (2) and checks an estimate made by a technical group from the Koppers Co. (1, vol. IV), but it is much higher than that of Egloff (1, vol. IV)." The latter's survey of the consumption of petrochemicals includes a forecast of a total production of 3.5 billion lb. of plastics in the United States in 1955, 4.8 billion in 1960, and 9 billion in 1975. The Commission observed that plastics have in the past and will in the future substantially supplement the supply of the following materials by replacing them in various applications: copper, zinc, lead, tin, steel, glass, leather, ceramics, rubber, and wood.

The present position of plastics in other parts of the world is one of growth and increasing competition (3). Production in 1951 is estimated as 170,000 tons in the United Kingdom and in Germany, and 50,000 tons in Japan. Production capacity in the rest of Western Europe, other than the United Kingdom and Germany, is of the order of 150,000 tons, including 45,000 tons for France, 40,000 tons for Italy, 20,000 to 35,000 tons for Switzerland and 15,000 tons for Belgium. Western Germany is reported to be producing now at a rate about equal to the previous German peak, reached in 1943, of 200,000 tons per year. Output capacity in Britain should reach 350,000 tons in 1953. The 1951 export situation in the principal countries concerned is given in tons of plastics exported and percentage of production as follows: United Kingdom, 53,000 tons, 30%; Germany, 25,000 tons, 15%; Japan, 2000 tons, 4%; and United States, 75,000 tons, 7 percent.

The rapid expansion of the plastics industry during the present decade has had its repercussions in the raw materials sector of the chemical industry. The petroleum industry has become a major producer of benzene, supplying 28 million gal. in 1951 and approximately 45 million gal. in 1952. It is estimated that the benzene output from this source in 1955 will be 145 million gal. of the 380 million gal. required (4,5). Another domestic source of aromatic chemicals for plastics came into being in 1952 with the completion of the coal hydrogenation plant of Union Carbide and Carbon Corp., which can process 300 to 500 tons of coal per day. In addition to producing several million lb. annually of naphthalene, toluene, phenol, cresols, and benzene, many new organic compounds of potential interest as monomers for plastics have been identified in the output of the new plant (6). Production of new organic chemicals by irradiation of abundantly

Polyacrylonitrile was used to treat soil (left) to improve its structure. Untreated soil (right) is less workable, forms hard crust which retards germination of seeds

Courtesy Monsanto Chemical Co.



* Reg. U.S. Pat. Off.
[1] Numbers in parentheses link to references starting on p. 184.

available materials in atomic piles is another potential source of raw materials for the plastics industry in the foreseeable future.

Materials

Acrylics—The introduction of fluorescent acrylic and extruded thin acrylic sheet and the production of large cast sheets up to 8 by 10 ft. in size have resulted in the development of new methods of forming acrylics and new applications in the architectural, aircraft, and lighting fields, signs, and housings for dispensing machines and public record players (7). Experimental work on biaxial stretch-forming of acrylic sheet at the National Bureau of Standards has shown that this process imparts a high degree of toughness and craze resistance to formed acrylic parts, possibly to such a degree that glazing for pressurized aircraft need not be laminated (8). Problems relating to dehumidification of storage rooms for laminated acrylic (9) and the selection of strippable coatings for application to aircraft enclosures (10,11) were discussed.

A tremendous potential market for hydrolyzed polyacrylonitrile has been opened up by the discovery that this material is 100 to 1000 times as effective in improving soil structure as is compost, manure, or peat moss. It is reported by the manufacturers of one such material, Krilium, that it increases the aeration of the soil, provides better utilization of nutrients in the soil, improves water infiltration, makes the soil more workable, and greatly reduces erosion (12). Additional information became available on the properties of polymethyl alpha-chloroacrylate (13), polymethacrylamide (14), polymethyl methacrylate (15,16), and copolymers of acrylonitrile and acrylic acid esters (17).

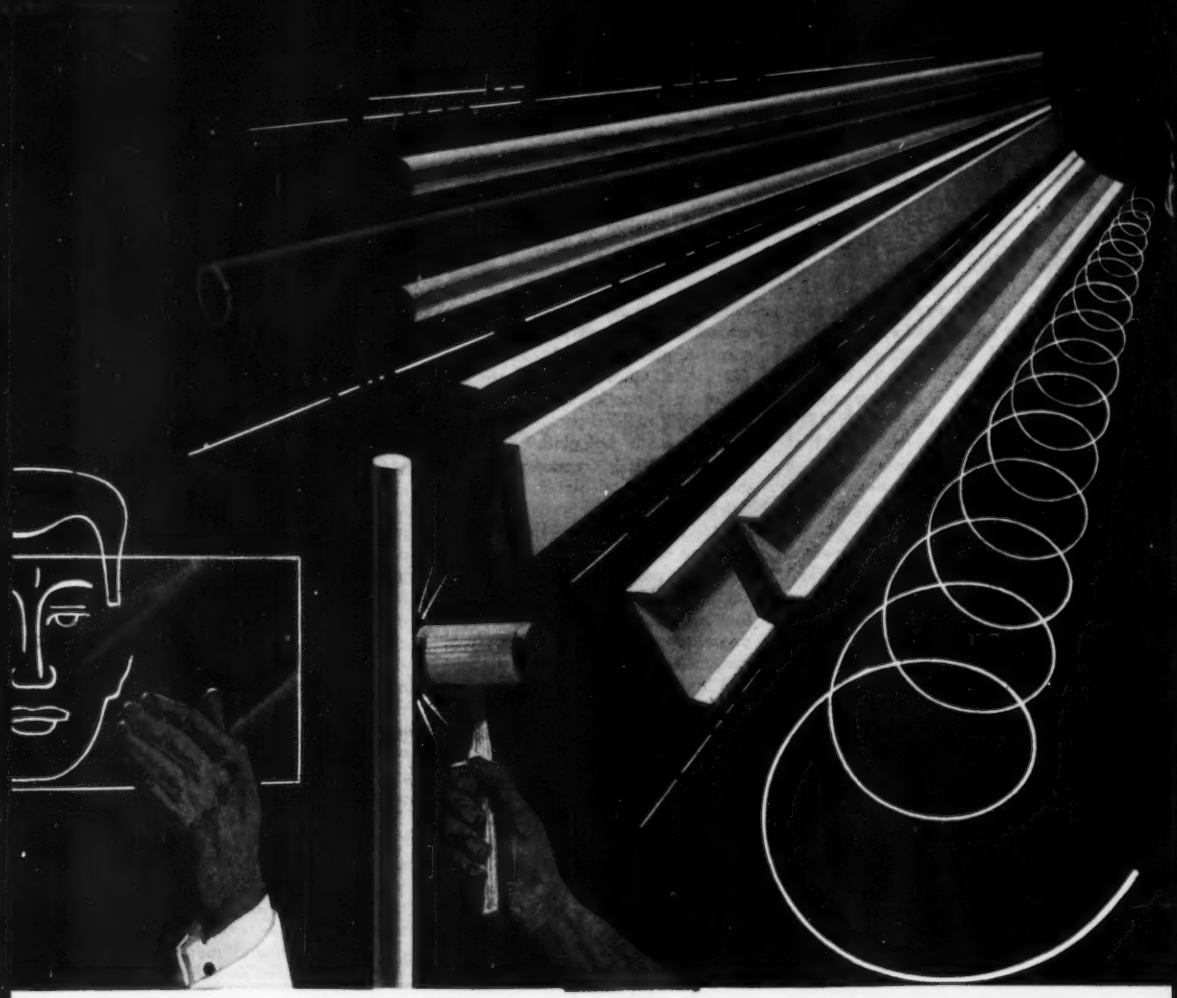
Amino Resins—The significant position of melamine resin in the plastics field was recognized by the presentation of the 1951 Hyatt Award to Palmer W. Griffith for his work on the development of this resin (18). The aminoplastics continue to be employed in increasing quantities as finishing agents or additives to improve the qualities or rectify the shortcomings of paper, textiles, leather, and other commercially important fibrous materials (19,20). These resins are also used to improve the water resistance of alkyd coating resins (21) and to produce a raised surface printing on paper for blind readers (22). New data were published on the reaction of urea and formaldehyde (23).

Cellulosics—Improved techniques for vacuum forming and printing on cellulose plastic sheets (24), lamination of film to printed surfaces (25), and continuous extrusion of variegated strip used in eyeglass frames (26), and of sheet and pipe (27) have been described during the past year. After eight years of continuous service, butyrate piping used to transport wine is in excellent working condition and permits visual check of the flow at any point (28). An experimental installation of butyrate pipe as an underground conduit for an electric power line was made to explore the possibility of adding this industrial application to the many and varied successful uses of the plastics pipe (29). Inhibitors to protect cellulose esters against breakdown by heat and light (30) and a method for the determination of the degree of polymerization of cellulose acetate (31) were reported.

Epoxy Resins—This newest and most versatile of the synthetic resins, which only emerged from the pilot plant stage in this country in 1950, is currently being produced at the rate of 12 million lb. per year. It is noteworthy that practically all of the large materials manufacturers are developing new products to take advantage of the unusual characteristics obtainable in this molecular structure and that a score or more of small firms are formulating special epoxy compositions for a growing range of applications. Such applications now include linings of tank cars for transporting chemicals; coatings for collapsible tubes; potting compounds for subminiature electronic units, television components, and frequency filters for coaxial telephone cables; adhesives for steel window frames, furniture, and aircraft sandwich construction; glass-fiber-reinforced plastics for high-strength structural parts and pipe patches; and stabilizers for polyvinyl chloride film and chlorinated paraffin coatings applied to fabric for flame- and mildew-proofing (32-37).

Ethylene Polymers—Noteworthy achievements in methods and machinery for the fabrication of polyethylene highlighted the record of 1952. Carboys of 14-gal. capacity for the shipment of corrosive liquids were made on specially built injection molding machines (38). Advantageous operating conditions for increasing the output and quality of extruded polyethylene film were described (39). Specially designed multi-cavity molds were used to injection mold protective plugs and caps (40) and tiny "O" rings for military time fuses (41). Other specialty applications developed for polyethylene include an air filter utilizing shredded film (42), an aerial tow target of loosely woven filament (43), and a self-charging siphon for handling acids and other chemicals (44). Methods for studying the cracking sensitivity of polyethylene cable (45,46) and the degradation of this polymer (47,48) were described. Tests were reported which demonstrated the suitability of polyethylene pipe for conveying strong solutions of chlorine, sulfur dioxide, and other corrosive substances, but indicated that a taste might be imparted to water in systems involving long runs (49).

There are now four fluorocarbons on the market in the United States, —Teflon, Kel-F, Fluorothene, and Exon (formerly called Veloform)— and about 100 processors of these materials (50,51). The heat resistance (500° F.), electrical characteristics, chemical inertness, and non-adhesiveness of the polytetrafluoroethylene, Teflon, are responsible for its growing use in electrical insulation, chemical equipment, packaging machinery, and gasketing products (52-57). The production of polymonochlorotrifluoroethylene should increase markedly in 1953 with completion of a plant for making 50,000 lb. of Fluorothene per month and a plant for producing 100,000 lb. of Kel-F per month. The greater ease of fabricating products from this mixed chlorofluoro polymer offsets its lower heat resistance (390° F.) as compared to Teflon. Most of the applications of this polymer are for military purposes today. The experience gained, however, in both fabricating and end use should prove valuable in promoting civilian applications when the supply situation improves. As in the case of Teflon, wire coat-



What are your vinyl rigid requirements?

Extrudability? Try **Marvinol® NR 7020**—as extrudable as elastomeric materials! This unique compound has been successfully extruded on every type of commercially available extruder. Continuous extrusions of 30 lbs. per hour have been made with 1½" single screw machines—50 to 60 lbs. per hour with 2½" single screw.

High impact strength? **Marvinol NR 7040** offers *tremendous* impact strength! (Izod notched impact values of 15 to 20 lbs. per inch on extruded pipe!)

Clarity? It's yours—with new **Marvinol NR 7045!** This outstanding new compound has *excellent* transparency. It contains no lead stabilizer, processes easily, and welds perfectly—strong as the material itself.

Whatever your specific requirements, you'll find the answer to rigids is Naugatuck. A pioneer and leader in the development of high molecular weight rigid vinyls, Naugatuck offers a series of compounds with the widest possible range of properties. **Marvinol** rigids have proved their ease of processing and many other advantages in years of service in chemical pipe, tubing, rods, channels, and extrusions of all kinds.

* * *

For more about **Marvinol** rigids—members of a large family of Naugatuck products, including **Vibrin®** polyesters and **Kralastic®** resin-rubber blends—simply send the coupon below.

Naugatuck Chemical

Division of **UNITED STATES RUBBER COMPANY** • Naugatuck, Conn.

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis
New York • Philadelphia **IN CANADA:** Naugatuck Chemicals, Elmira, Ontario

Naugatuck Chemical, 21 Elm Street, Naugatuck, Conn.
Please send technical data on Marvinol rigids to:

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

ing is presently the largest volume use of the chlorofluoropolymer (58).

The newest fluorocarbon on the market is Exon, 400 XR-61, reputedly a copolymer of vinylidene fluoride and chlorotrifluoroethylene. It is reported that it resists heating at 350° F. for 200 hr. and can be injection molded at 435° F. and 10,000 p.s.i. pressure. It is recommended as a coating for metal containers, and as a lining for iron, wood, and concrete tanks to permit their use as a replacement for glass or stainless steel tanks (50). Another halogenated derivative that offers considerable promise as a weather-resistant elastomeric product is chlorosulfonated polyethylene, Hypalon S.

Furan Resins—Current developments in the use of furfural and furfuryl alcohol to make resins were surveyed (59,60). By far the largest quantity of furfural used in resin manufacture is consumed by the phenolic resin industry to make the long-flow fast-curing compounds employed for large moldings. It is estimated that 30 to 35% of the total phenolic molding powder made in 1952 was of this phenol-furfural modified type. Furfural is also useful in making cast plastics (61), coating resins, brake-lining binders, impregnating resins for carbon and graphite articles, and specialty resins, such as acid-catalyzed furfural, furfural-ketones, and furfural-aniline.

The most important industrial reaction of furfuryl alcohol is resinification in the presence of acid to produce a low-cost, heat-stable polymer inert to strong alkalies, acids, and organic liquids. It serves as a corrosion-resistant material in asbestos-filled cast parts, glass-cloth laminates, and battery cases; as an inert impregnant for porous stoneware and sandstone; as a chemical-resistant cement for brick-lined tanks, reactors, and factory floors; and as the base for a conductive floor in hospital operating rooms and explosives plants to reduce the possibility of electrostatic spark discharges.

Phenolics—The rubber-phenolic compounds are replacing wood, metal, ceramics, leather, and rubber in many applications in textile equipment, automotive parts, communications, home appliances, and business machines, and are doing a superior job at lower cost. It is estimated that they will account for 7 to 10% of the total phenolic molding powder sales in five years (62-64). Nylon-fabric phenolic laminate provides a terminal board for electronic equipment which has high insulation resistance in the presence of high temperature, humidity, and fungus exposure; it also has high impact strength and low water absorption and is readily fabricated (65). A significant addition to the roster of phenolics is a compound that yields molded parts sufficiently conductive to be plated directly, thus permitting economical production of metal-plated parts for automotive trim, hardware, and electrical appliances (66). Construction and molding details were published for use of a phenolic-asbestos composition to mold a delta wing for a small airplane (67). The preparation of phenolic resins from various raw materials and catalysts was investigated (68-72) and information was published that makes it possible to calculate warping stresses set up in molded phenolics by absorption of moisture (73,74).

Polyamides—Improved techniques for the injection molding and extrusion of nylon were described, with emphasis on the importance of dryness of the molding powder (75-76). Nylon parts molded or fabricated from extrusions are finding important engineering applications in bearings for pumps, drilling machinery, conveyor rolls, transmissions, and pneumatic tools (77,78), rims for counters (79), and gears and cams for mechanical equipment (80). A recent innovation is the use of a nylon conveyor system in a commercial dishwasher. The only contact of the dishes in this washer is with the molded nylon. In contrast to most applications in which only a few oz. of nylon are used per part, the smallest model of these washers uses about 50 lb. of the plastic (81). Amide interchange during synthesis of polyamide copolymers was investigated (82).

Nylon rims on counter wheels resist abrasive action of moving wire screen

Polyesters—The outstanding recent advance in unsaturated polyesters was the development of a low pressure laminating resin resistant to temperatures up to 500° F. This resin is a crosslinked copolymer of triallyl cyanurate and a maleic alkyd. It yields laminates with 181-114 glass fabric which have flexural strengths of 40,000 p.s.i. at 300° F. after 200 hr. exposure and over 30,000 p.s.i. at 500° F. after 24 hr. exposure (83,84). Glass-fiber-filled polyester molding compounds have higher impact strengths than other molding compounds, combined with excellent arc resistance, dimensional stability, and heat resistance, and are fast curing at moderate pressures (85-87). Exotherm curves are advantageous in the selection of suitable polymerization systems and in the control of cure of cold-setting polyester resins in production (88).

Experimental work with isophthalic and terephthalic acids has shown that many new and interesting polymers can be produced from these dibasic acids, using any of a number of diols and diamines as chain builders, and modifying the structure with cross-linking agents, such as polyhydric alcohols, polybasic acids, polyisocyanates, and unsaturated acids, alcohols and aldehydes (89). A simple polyester of this type is the one that is made with ethylene glycol and terephthalic acid and used as the base for Dacron fiber and Mylar film. The latter has higher impact and tensile strengths than other plastic films, can be furnished as thin as ¼ mil, compared to the thinnest cellophane of 0.8 mil, and retains mechanical strength at temperatures from −60° to 325° F. It is expected that when this film becomes available in commercial quantities it will find ready markets in sound recording tape, pipe covering, storm windows, electrical insulation, and packaging applications (90).

Silicone Polymers—An estimate of the production of silicones in 1951 places it at about 10 million lb., with fluid types leading, followed closely

Put MOSINEE Forest Fibres

to work . . . in your plastics

Remember . . . MOSINEE means more than "paper" to plastics experts. MOSINEE stands for FIBRES that have scientifically controlled chemical and physical properties to perform specific jobs . . . fibres of dependable uniformity on which you can rely in your plastics processing operations.

MOSINEE has its sources of quality forest fibres, practical experience, laboratory facilities and scientific production controls to create and produce the type of fibres your plastics operations needs . . .

- Fibres absorbent or non-absorbent . . .
- Fibres tough, flexible or stiff, dense or porous, mold-resistant . . .
- Fibres for impregnation with resin or other plastics . . .
- Acidity or alkalinity-controlled fibres . . . or fibres made as you need them, controlled to *your* specifications. Contact . . .

MOSINEE PAPER MILLS COMPANY • Mosinee, Wisconsin

MOSINEE makes fibres work for industry

by the rubber products, and then by the coating and varnish resins and the laminating and molding compounds (91). Plant expansion programs totalling about $20 million have been announced by three producers. The important fields of application include Class H electrical insulation (365° F.), silicone-glass laminates (92,93), silicone rubber shock mounts, gaskets, and diaphragms serviceable from 500° F. to −100° F. (94,95), and water-repellent coatings for masonry. An improved tape-resistor system for printed circuits is made of asbestos paper, carbon, and silicone binder to yield a resistor capable of operation up to 390° F. and covering a range from 10 ohms to 10 megohms (96). The relation between structure and properties of silicone polymers was explored (97).

Styrene Polymers and Copolymers—The growing importance of styrene copolymers and alloys in molding compounds and sheet thermoplastics was pointed up in two comprehensive surveys of the properties and applications of these materials (98,99). The five basic materials entering into these plastics of high impact strength are polystyrene, styrene-butadiene and styrene-acrylonitrile copolymer resins, and styrene-butadiene and acrylonitrile-butadiene rubbers. The styrene-butadiene resin is commonly alloyed with either polystyrene or styrene-butadiene rubber, and the styrene-acrylonitrile resin with the acrylonitrile-butadiene rubber. Other combinations of the five materials, however, also form compatible alloys and are undoubtedly employed as part of the maze of formulations encountered on the market. These compositions are being used to mold or form refrigerator door liners, housings and containers formerly made of metal, wash basins, pipe, display accessories, boat decks, and other large household, transport, and industrial items requiring toughness, dimensional stability, chemical resistance, and ready fabrication (100-103).

A battery case weighing 8½ lb. is being injection molded of polystyrene in a 300-oz. machine, using a mold weighing approximately 7 tons (104). Factors involved in the selection of coloring materials for polystyrene and the proper conditions of mixing the components of the molding powder were discussed (105). New information on the strength properties (106), creep (107), and heat distortion (108) of polystyrene was published. The properties of styrene-maleic copolymers, useful as thickening and stabilizing agents, adhesive ingredients, and coating resins, were investigated (109).

Vinyl Polymers and Copolymers—The leading thermoplastic, polyvinyl chloride, continues to demonstrate its versatility in a wide range of applications, among which are included packaging films (110,111), piping (112), conveyor belting (113), motion picture screens (114), strippable protective coatings (115), street crossing markers (116), elastomeric gaskets for concrete construction (117), shoe construction (118), and telephone exchange equipment (119,120). Slush molding techniques with plastisols were improved (121,122). One automatic casting machine now available can turn out 150 000 pieces per day (123).

When thickening agents such as metallic soaps are added to vinyl plastisols, putty-like substances are obtained which have been given the name of "plastigels." These offer an economical means of producing molded, embossed, and dipped plastic products (124). Two companies have introduced special high molecular weight resins which are processable unplasticized on standard equipment into hard vinyl sheets, rods, and tubes. Important new applications are expected to be developed for these tough, dimensionally stable materials (125). A new technique for producing vinyl film by the blow molding process was described (126).

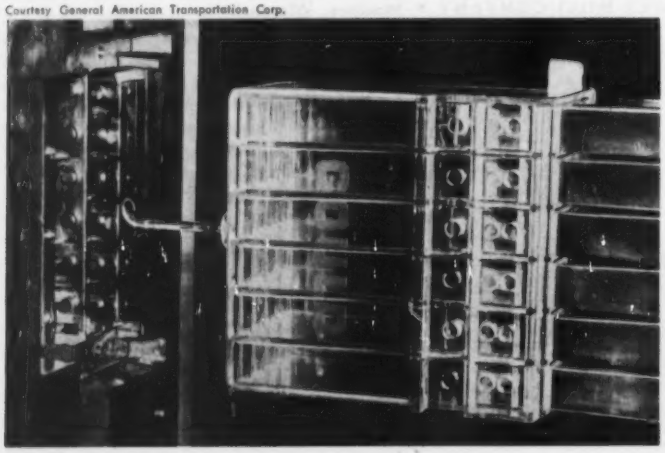
Trends in the development and utilization of plasticizers for vinyl plastics (127) and the properties obtainable by compounding with chlorinated diphenyls (128) were reviewed. The production and properties of latices of flexible synthetic polymers were described (129). New information was published on the creep (130) and resilience (131) of plasticized polyvinyl chloride and the mechanism of degradation of this polymer (132).

Saran is now available in the form of fine continuous and staple fibers in thicknesses of 10 denier and up; a wool-like curl can be imparted to it (133). The heavier filaments of polyvinylidene chloride were used to make upholstery fabrics (134) and insoles for army boots (135). Reports on other vinyl polymers included the use of polyvinyl formal to make sponges (136), exposure tests on polyvinyl butyral coated fabrics (137), properties of polyvinyl acetate polymers (138, 139) and emulsions (140), the solubility of polyvinyl pyrrolidone (141), and the preparation of various copolymers with polyvinyl chloride (142-144).

Other Polymers—Technical developments were reported concerning asphalt (145), polyindene (146),

Styrene battery case weighing 8½ lb. as it comes from mold. Punch segments (right) form the six separate compartments of the case. Molding is done on a 300-oz. machine

Courtesy General American Transportation Corp.



Cabot Plasticizers

A Complete Range for Use in Vinyl Compounds

- Manufactured to Highest Quality Product Specifications
- Quality Controlled Throughout Every Step of Manufacture
- Guaranteed by a Company Serving Industry Since 1882

CabFlex DI-OP*		

*First of alkyl phosphates to be introduced to industry in commercial quantities.

Technical Bulletins and Samples Available Upon Request

CABOT

Plasticizer Division

GODFREY L. CABOT, INC.

77 FRANKLIN STREET, BOSTON 10, MASS.

Courtesy Bakelite Co.

Phenolic foam, used in packaging, has density of about 0.3 lb. per cu. foot

chlorinated rubber (147), hard rubber (148), and synthetic and natural rubber (149-151). Polybutadiene is converted from a rubbery product to a hard, rigid material by heating for several days at about 250° C. (152). Polymers of fumaronitrile (153), cyclopentadiene (154), styrene and isoprene (155), and butadiene (156-159) were described. Numerous reports were published on the mechanisms and kinetics of polymerization (160-163).

Ion Exchange Resins—Organic adsorbents of the phenolic and amino types were prepared and evaluated (164). Ion exchange resins were shown to be useful in the processing of sugar cane juice (165), catalysis of organic reactions (166), and the preparation of standard sodium hydroxide solutions (167).

Expanded Plastics—Several interesting applications of these low density materials, which supplement their previous successful uses in flotation devices and display media, were described. The radio relay lens used to pick up and transmit high-frequency telephone and television signals for long distances contains 500 lb. of styrene foam in the form of 2000 blocks bonded together with acrylic cement (168). Phenolic foam serves as the insulating material in containers used for air shipment of whole blood (169) and as a more efficient packing material than shredded paper or straw in the shipment of fragile glassware and ceramics (170). The Quartermaster Corps has developed a container insulated with shredded urea foam and expanded styrene-butadiene copolymer for transporting hot food from supply kitchens to the front lines (171). New blowing agents for producing vinyl and rubber foamed articles were described (172-175). Expanded phenolic resin was proved to be the most resistant to tropical exposure conditions in a series of tests which included foamed plastics made of urea-formaldehyde, polystyrene, polyvinyl chloride, polyvinyl formal, cellulose acetate, and rubber (176).

Sandwich Construction—Honeycomb cores made of cellulose acetate film (177) and glass fabric, glass mat, or paper impregnated with polyester or phenolic resin (178) were described. Applications of sandwich structural materials in aircraft, truck bodies, furniture, and building construction were reviewed (179,180). Procedures were outlined for repairing radomes of sandwich construction (181). New data on the properties of honeycomb cores (182) and sandwich panels (183-185) became available.

Laminates—The record of 1952 is replete with details of novel and successful applications of glass-fiber-reinforced polyester plastics. The announcement that a sports car body is now in commercial production was hailed as the forerunner of further developments to come in this large market for plastics. The body is molded in one piece, fits a 100-in. wheel base, weighs 185 lb., is dent-proof, and can be repaired readily when fractured under heavy impact (186). A related development is the truck tank used by the Arabian-American Oil Co. for the transportation of diesel fuel, gasoline, and potable water. The 1000 gal. capacity of the plastic tank compared to its 1000 lb. weight represented a 50% increase in efficiency on a capacity-weight basis over the formerly used steel tank. The reinforced plastic tank also successfully resisted the corrosion to which the steel tank was extremely vulnerable (187). An Arctic shelter for jet planes is constructed of 4- by 8-ft. reinforced plastic panels fastened to magnesium arches; these materials provide a unit which stacks readily, is light enough to be shipped by air, and is speedily assembled where needed (188). Other significant reinforced plastic items include a mortar pan which weighs only 4 lb. as compared with 18 lb. for its steel counterpart (189), pipe made by a continuous process and now available in 20-ft. lengths with inside diameters from 2 to 6 in. (190), Quartermaster Arctic sleds weighing 36 lb. and capable of transporting 200-lb. loads (191), a loud speaker for outdoor public address systems (192), aircraft parts such as radomes, ducts, airfoils, and loop housings (193), and a 20-ft.-diameter hemispherical dome for a portable planetarium (194).

Important new developments were reported in glass fiber finishes and resins designed to improve the wet strength and heat resistant properties of reinforced plastics. Among the sizing materials investigated were vinyl silicon (195,196) and methacrylate chrome complexes (197); these and other proposed new finishes have yielded materials which have flexural strengths in the wet condition that are 90% or more of those in the dry condition, as compared with a 40% average drop in flexural strength for the 114 finish heretofore commonly used (198,199). The new resins developed to give improved heat-resistant reinforced plastics were silicones (92,93) and polyesters (83,84,200). Results of tests indicate that these materials can be expected to be resistant to 500° F. for periods of 24 to 200 hr. and that the silicone reinforced plastics will be suitable for short time usage up to 900° F. Two reports presented results of fatigue and strength tests on glass-fabric laminates (201,202).

Wood Products—Increasing markets for resins in plywood, laminated timbers, and conversion of wood waste (203) and the need for adhesives that can be supplied, ready to spread, with long working life and short curing cycles at moderate temperatures (204) were stressed in two articles describing advances in these fields. Phenolic-impregnated paper surfaces on waterproof-grade plywood provide a material which can be used for concrete forms two to three times as often as ordinary plywood and decreases finishing costs as much as 60 percent. Other uses include exterior siding for buildings, cabinet and furniture manufacture, foundry matchboards, and anti-slip flooring (205). The results of an investigation of the influence of resin

Makes good merchandise sell better...

Hold Kodapak Sheet up to the light. Clear as crystal, it sparkles with brilliance. This you see instantly, realize that here is a material endowed with package-glamour, with real sales-appeal. But what you can't see is vital, too—the sheet-after-sheet uniformity that makes Kodapak always efficient, always economical to use.

For further information, consult your local representative, or write Cellulose Products Division, Eastman Kodak Company, Rochester 4, N.Y.

Sales offices: New York, Chicago, Dallas. Sales representatives: Providence, Cleveland. Distributors: San Francisco, Los Angeles, Portland, Seattle (Wilson & Geo. Meyer & Co.) Toronto, Montreal (Paper Sales Limited).

Dorothy Lamour, courtesy of Paramount Pictures

Kodapak Sheet

"Kodapak" is a trademark

composition on the properties and structure of resin-impregnated wood were reported (206).

Plasticizers—New plasticizer developments were reviewed and future trends forecast in two fine reviews (207). It is estimated that the 1952 production of plasticizers exceeded 300,000,000 lb. compared to 280,000,000 lb. produced in 1951. The properties of plasticizers supplied as derivatives of three readily available organic acids—citric (208), lactic (209), and sebacic (210)—were described. Other authors presented test methods for the determination of plasticizer quality (211), concentration in cellulose acetate plastics (212), and color stability of tricresyl phosphate (213). The behavior of pigment colors in plasticized polyvinyl chloride plastics was reported (214).

Processing

Molding—Preplasticizing with its attendant advantages of greater shot capacity, production of relatively strain-free molded parts, and reduction of scrap continued to receive the attention of design engineers in this field (215, 216). A new machine was developed with four preplasticizers feeding into one injection chamber, giving it a rated capacity of 375 oz. of polystyrene. It is being used to mold such large parts as battery cases, silverware chests, lighting fixtures, and refrigerator door liners (217). Weigh feeding of material into the injection chamber is recommended to produce moldings of heavy sections without flash and internal strains (218, 219). Equipment and procedure for measuring the heating capacities of injection molding machines was developed (220), and was proposed for use in establishing a standard rating procedure for output of such machines (221). New machines for the injection molding of large polyethylene parts (222) and the extrusion of unplasticized polyvinyl chloride pipe (223) were described. Noteworthy contributions were published on the flow of plastic materials in pipes (224), the induction heating of press platens (225), the electrostatic ignitability of dust clouds of resins (226), and the tumbling of molding powders in specially designed shipping drums to obtain uniform distribution of particle sizes (227).

Cost accounting systems were suggested to make possible rapid and accurate estimation of mold prices (228) and proper allowance for depreciation of molding plant machinery due to wear and tear, obsolescence, and other deteriorating factors (229). Some problems encountered due to faulty design of molded plastics were discussed by a panel of consumers (230).

Laminating—Methods adaptable to the fabrication of reinforced plastic products continued to hold the spotlight in this field. One Navy authority reported on the respective merits of four ways of constructing plastic boats—hand lay-up and bag methods using single molds, and matched-die high pressure and vacuum injection methods using two molds (231). Details of production techniques used in making ship and aircraft models for tests in basins and wind tunnels at the David Taylor Model Basin were revealed (232). Unidirectional glass fibers enclosed within braided sleeving have been applied to give added strength in areas of greatest stress on parachute seats molded of glass-fiber preforms on matched dies (233). Air-powered equipment has been employed on machines used for fabrication of laminates to gain the advantages of automatic operation, namely, increased output and greater accuracy of dimensions by unskilled labor (234). Techniques for cutting, machining, and mounting decorative laminates were described (235).

Casting and Mold Making—Detailed information was published on the selection of resins for potting electronic components, preparation of the assemblies, the effects of various catalysts, accelerators, and fillers, and the optimum curing conditions (236-238). Phenolic casting resins have proved useful in making dies for forming sheet thermoplastics (239) and master models for production of multi-cavity steel molds by pantographing (240). Phenolic, polyester, and epoxy resins are being cast into semi-intricate shapes in inexpensive molds made from vinyl plastisols (241). A process for making low-cost molds by metal spraying is of interest in supplying dies for sheet forming, slush casting, paint masks, and low pressure laminating. Plastic casting resins can be used for the master models needed in this process and the backing material for the sprayed shells (242). Air-gap insulation has been found to be advantageous in obtaining close temperature control in dies for molding plastics (243).

Fabricating and Finishing—Automobile seat cushions and interior side panels are now being produced by a molding procedure which has eliminated all sewing operations and mechanical fastening of decorative metal strips. The sandwich assembly of decorative chrome metal strip (0.008 in. thick), phenolic-impregnated paper, upholstery, wadding, phenolic-impregnated paper, and foundation board is placed between simple, inexpensive molds constructed of steel plate and bars. This revolutionary production technique has radically reduced labor costs, increased wearability, and made possible unlimited design possibilities with cost of change-over

In one step of process for patching all kinds of pipe with fibrous glass reinforced epoxy resin, bat of activated glass mat is tied over patch to speed up cure

THE *VERSATILE* PLASTIC

No need to state the virtues of polystyrene. It is accepted all over the world for its versatility . . . its adaptability. At long last the designer has been given a moulding powder reasonably free from limitations.

No need either to state the virtues of Kleestron. Enough to say it is made by Kleemann's in their new factory at Welwyn Garden City and is being sold . . . and moulded . . . and praised all over the world.

O.& M. KLEEMANN LTD.

Address all enquiries to :

O. & M. KLEEMANN LIMITED

West Halkin House, West Halkin Street, London, S.W.1., England

from one design to another practically nil (244).

Equipment for high-vacuum metallizing of plastic parts has been developed to minimize the handling of parts. Three major steps are involved: 1) Baking on of a suitable lacquer undercoat; 2) deposition of metal by evaporation in a high vacuum; and 3) application of a baked-on protective coating (245). Other variations in processes for metallizing plastics were described (246-249). Significant advances were made in cool grinding (250), barrel-polishing (251), cementing (252), electrostatic flocking (253), washing (254), and destaticizing (255) of plastic materials. Recommended procedures were outlined for the application of statistical quality control to molding operations (256).

A new high-speed calender for the production of vinyl film for rain-wear, draperies, shower curtains, garment bags, and the like is capable of producing 120 miles of film, up to 20 mils in thickness and more than six ft. wide, in a 24-hr. day (257). Developments in processes for applying finishes to plastic film include emulsion photo-decorating (258), integral fusion of polymerizable printing materials to base sheeting (259), and a finishing machine that is capable of doing gravure or relief printing, wipe-shading, lacquering, and color tipping of embossed stock (260). Improved equipment was described for vacuum forming of thermoplastic sheeting (261), control of porosity of film by "electroventing" (262), and heat sealing (263).

Applications

Synthetic Fibers—The synthetic fiber industry is destined to become a major consumer of synthetic resins, according to the Paley Commission report (1). It is estimated that on the basis of population increase fiber consumption will advance from 6 billion lb. in 1950 to 7½ billion lb. in 1975. The Paley Commission allots 2 billion lb. of the latter to rayon and 1¼ billion lb. to other synthetic fibers. Other chemical economists expect the synthetic fibers to have even more of an impact on the textile industry. Ewell (2) estimates production of all synthetic fibers in 1975 will reach 6 billion lb., whereas Egloff (1, vol. IV) estimates 3 billion lb. for rayon (70% viscose and 30% acetate) and 4 billion lb. for other synthetic fibers.

Courtesy The Sun Rubber Co.

Automatic plastisol casting machine can turn out 150,000 pieces per day

Publication of a symposium on synthetic fibers made available a wealth of information on properties, applications, and trends in this field (264-270). Other contributions to the 1952 literature dealt with problems encountered in handling and using synthetic fibers and fabrics (271), applications of fibers in the chemical industry (272), and the production of carpets by bonding fibers with polyvinyl chloride (273).

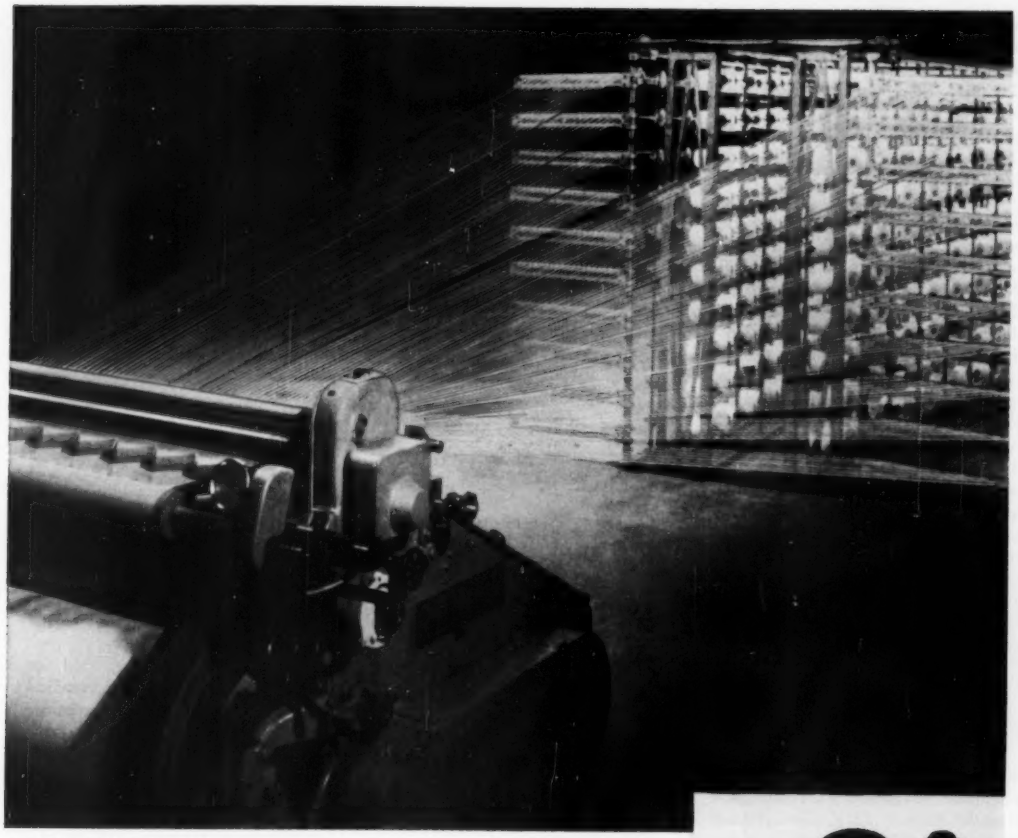
Chemical—Progress reports on plastic pipe described the rapid headway being made and attributed the success to the pipe's ability to resist corrosion, its ease of installation, and the more efficient transmission of liquids due to its smooth interior walls (274, 275). Polyethylene pipe is in production in this country by eight firms, butyrate by eight, saran by three, styrene copolymer by six, hard vinyl by four, and reinforced polyester pipe by four firms. Principal uses include cold-water and drainage systems, oil and gas lines, and chemical plant installations. Polyvinyl chloride sheeting with joints welded by means of a hot-air torch is used as a liner for concrete sewer pipes to protect against deterioration by hydrogen sulfide. One installation is in a seven-mile-long sewer in California, requiring 400,000 sq. ft. of the liner (275).

Phenolic, furan, vinyl, and styrene copolymer plastics continue to record new successful applications in chemical process equipment, such as hoods, ducts, tanks, towers, valves, piping, and fittings (277-279). Other developments in the use of plastics by the processing industries included acrylic inspection windows in flour milling machinery (280), polyethylene wiper blades on face cream packaging equipment (281), polyvinyl chloride belting for mine conveyor systems (282), vinyl protective clothing and gloves (283, 284), precision moldings for textile machinery (285), and vinyl wheels on closure-tightening machines (286).

Transportation — The automotive industry ranks as one of the most important industrial markets for plastics. In 1950 there were approximately 53 million passenger cars, trucks, and busses in operation in the United States and since that year at least 15 million new passenger cars have been manufactured. A great variety of parts molded or fabricated of acrylics, cellulosics, nylon, styrene copolymers, vinyls, and thermosets go into these cars (287, 288). Current developments in the molding of sport car bodies (186) and truck tanks (187) of glass-fiber reinforced plastics indicate that these materials will become of even greater significance in this industry in the near future. The history of the development of resin-impregnated brake lining materials and the bonding of these linings to brake shoes was reviewed (289, 290).

Many plastic products were used to achieve comfort and fire resistance on the new superliner *United States*. These include decorative laminates for furniture, synthetic fabrics for draperies and bedspreads, glass mat lampshades, acrylic glazing for the crow's nest, and resin-impregnated panels for bulkheads, walls, and ceilings, in addition to the usual types of application in electrical insulation, communications equipment, deck coverings, bearings, and the like (291). An evaluation of plastics, steel, and non-ferrous metals for marine gear applications was made (292). Developments in the use of plastics in railway (293) and aircraft (294) applications were also reported.

Miscellaneous—Adhesives were evaluated for use in aircraft construction (295), packaging (296), bonding rubber to steel (297), and



(Photo: Courtesy of Robert Reiner, Inc.)

Miles of Nylon filament with a problem in every inch . . . for SYNTHANE

You are looking at thousands of miles of the hair-fine filaments that go into nylon fabric.

Many equipment and processing problems must be worked out before these filaments emerge as blouses, curtains or couch covers. Synthane solves many of these problems. For example, to process nylon yarn, treatment with a corrosive size is necessary. Machine components made of Synthane laminated plastics stoutly resist corrosion.

The "elastic memory" of nylon causes the fit that endears nylon hosiery to women, but it also crushes ordinary bobbins on which the yarn is wound. Synthane laminated plastic bobbins successfully resist crushing.

Nylon filaments are glamorous. They are also so fine they must be handled gently. Synthane laminated plastic parts can be machined to snag-free super smoothness.

The properties that make Synthane laminated plastics essential to textile people may interest you. For information and ideas about how Synthane may be helpful to you, send for the Synthane Catalog. Synthane Corporation, 8 River Rd., Oaks, Pennsylvania.

Bobbins, pins and redraw caps made from Synthane laminated plastics. Synthane is also used for hosiery examining forms, measuring rolls, piping, gears, verge plates and many other textile parts.

Synthane-one of industry's unseen essentials

SYNTHANE

LAMINATED PLASTICS

for general engineering purposes (298). Resin-based coatings for special applications were described (299-303). The building industry employed plastics for air-conditioning units (304), translucent doors (305), vinyl-face acoustical tiles (306), kitchen work surfaces (307), greenhouse screens (308), Venetian blinds (309), and reinforced plastic awnings (310). Progress in the development of materials for use in electrical insulation was reported (311-314). Novel applications of plastics for medical purposes included a cast head for teaching x-ray techniques (315), a flexible cast for use during x-ray treatment (316), and a molded vaporizer unit for home use (317). Resins, plasticizers, stabilizers, colorants, and antistatics suitable for use in manufacturing films for food packaging have been listed (318). Other packaging applications include polyethylene collapsible tubes (319), rubber hydrochloride film (320) and resin-coated paper (321) for liquid food products, a vacuum container made of saran film and a metal base for meats (322), and vinyl containers for individual portions of preserves (323).

There were noteworthy developments in the use of plastics in telephone equipment (324-326), automatic alarms (327), photographic accessories (328, 329), musical instruments (330), welding equipment (331), foundry cores (332), furniture (333), household appliances (334), refrigerators (335-337) and paper plates (338). Two industry reviews described the fabrication of plastic props for stage, screen, and television performances (339) and trends in the manufacture of plastic toys (340).

Properties, Testing, Specifications

Progress in the development and utilization of new and improved plastic materials is dependent upon efficient methods of evaluating their properties and the accumulation of the required engineering data. Fortunately many capable engineers and scientists are concentrating on these problems and contributing to a better understanding of the basic phenomena involved.

Mechanical properties investigated included stress-strain relationships (341-346); impact strength (347), stiffness (348), and fatigue (349) at low temperatures; abrasion resistance (350, 351); and frictional properties (352). Other reports dealt with thermal conductivity (353), refractive index (354), color measurement (355), light stability (356), arc resistance (357, 358), and the effects of moisture and fungus on plastics (359-362). The gas permeability (363, 364) and impact strength, tear resistance, and flex-life (365, 366) of plastic films were studied (367). In the field of adhesives evaluations were made of setting time (368, 369), blocking point (370), heat-sealing strength (371, 372), fatigue of resin-bonded aluminum joints (373), and the effect of temperature on shear strength of resin-bonded aluminum and laminates (374).

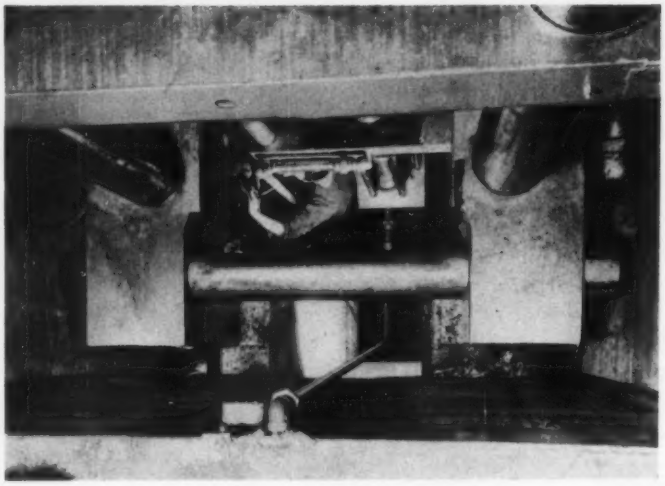
A new method of analysis of complex mixtures, chromatography, was proving useful in the separation and identification of components of resinous materials (375, 376). It depends upon a dynamic equilibrium between solutes, an irrigating solvent, and a sorbent which has a preferential attraction for the several solutes of the mixture. Ion exchange resins and paper have been shown to be particularly useful as sorbents for such separations. Color-developing reagents are used to detect the resolved components and provide a means of estimating the quantity of each present in the mixture.

Methods have been reported for the determination of acetyl in cellulose acetate (377), sodium carboxymethyl cellulose in detergent mixtures (378), methyl cellulose (379), monomer in polymethyl methacrylate (380), phenol in phenolic resin (381), plasticizer in polyvinyl chloride elastomers (382), and colloidal ions (383).

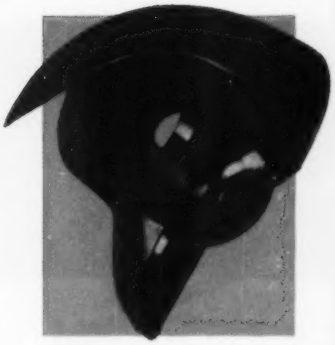
The search for quantitative relationships between polymer molecular structure and mechanical properties continued (384-386). The sizes and shapes of polymer molecules were being explored by means of viscometry (387-390), osmometry (391), light scattering (392, 393) and ultracentrifugation (394, 395). Ultrasonics (396, 397) and electron micrography (398) were also being used in determining physical constants and structure of polymers.

One of the leaders in standardization of test methods, specifications, and nomenclature in the plastics field, Robert Burns, presented an intimate account of their effect on plastics technology in this country and abroad (399). The Commission on Macromolecules of the International Union of Pure and Applied Chemistry published definitions and rules for naming new polymers (400). The next meeting

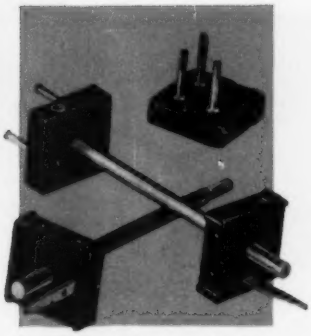
(*Continued on p. 187*)



Looking down into pit which houses clamping mechanism of vertical injection machine that, equipped with four pre-plasticizers, has rated capacity of 375 oz. of styrene

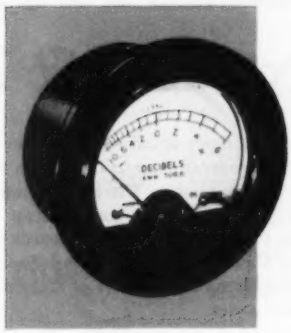


This water impeller for American Kitchens' new automatic dishwasher must withstand operating temperatures up to 200 deg. F., mild alkali and acid solutions. It's molded of BAKELITE Water-Resistant Phenolic BM-7156. **Molded by Plastics Molding Corp., Cincinnati, Ohio, for American Kitchens, Division of AVCO Mfg. Corp., Connersville, Ind.**

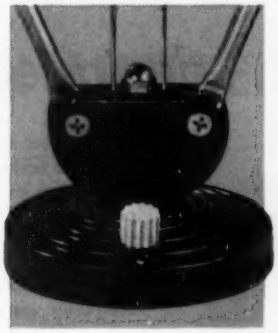


Spool assemblies for special telephone apparatus wound coils have metal inserts molded into BAKELITE General-Purpose Phenolic BM-120, affording simplified production, resistance to wear. **Molded by Kurz-Kasch, Dayton, Ohio, for Federal Telephone and Radio Corp., Clifton, N. J.**

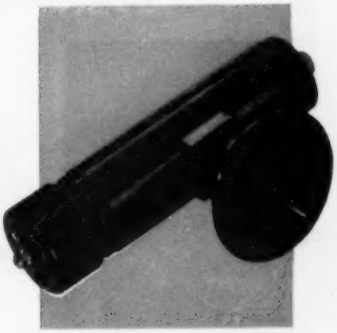
These shiny black bottle caps are made of BAKELITE General-Purpose Phenolic BM-13798. They're easily molded to good finish and clean detail, are strong, bleed resistant, unaffected by contents. **Molded by The Conart Company, Inc., Long Island City, N. Y., for Carbide and Carbon Chemicals Co., New York, New York.**



The housing of this electronic instrument is molded of BAKELITE General Purpose Phenolic BM-2498. It has an excellent finish, is low in cost, easy to produce. **Molded by Brill Manfort Co., Brooklyn, N. Y., for Mil Instrument Corp., Jamaica, N. Y.**



The base of the "Spico" indoor television antenna is molded of BAKELITE General Purpose Phenolic BM-14660. It has fine walnut mottle color, good finish, and clean appearance. **Molded for Spirling Products Co., Inc., New York, N. Y.**



This X-ray tube housing has high dielectric and mechanical strength, withstands high operating temperatures. It's molded of BAKELITE Phenolic BM-7436, specially formulated to provide protection against radiation. **Made by Machlett Laboratories, Inc., Springdale, Conn.**

to fit a wide range of jobs— a wide range of Phenolic Plastics!

The wide variety of BAKELITE Phenolic Plastics means that you can select the one that precisely fits your requirements.

Good finish, moldability, dielectric strength, resistance to impact, chemicals, heat and moisture—they're all properties of BAKELITE Phenolic Plastics. And with BAKELITE Phenolic Plastics, you can get these features in the exact degree and combination you need.

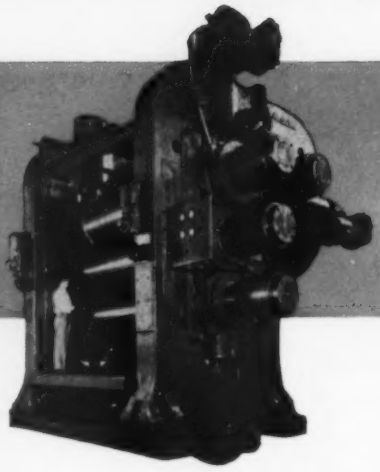
The examples above show how your product, too, could be *right* for the job if produced from BAKELITE Phenolic Plastics. Learn more about these "work-horse" plastics. Write Dept. OP-13.

BAKELITE
TRADE-MARK
PHENOLIC PLASTICS

TRADE MARK
BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.
In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.

CALENDERS

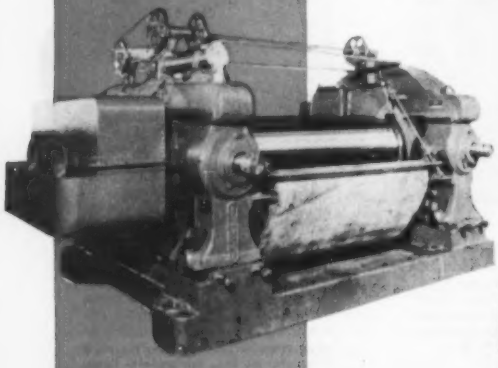
We make all types and sizes of Calenders, precision designed for extremely close tolerances to meet the most exacting requirements in the production of plastics film or the coating of fabrics with rubber or plastics. The unit shown is an ADAMSON UNITED 32" x 92", 4-Roll Plastics Calender geared to produce 72" wide vinyl film, 2 mils. or less in thickness at speeds to 150 YPM.



RUBBER and PLASTICS —

...designed and built by...

We engineer and build all types of individual production units and complete electronically controlled trains with all accessories for every Rubber or Plastics processing requirement. Our highly specialized engineering and production facilities plus the combined research and technical abilities of United Engineering and Foundry Company, and the manufacturing capacity of eight modern plants, are at your service.

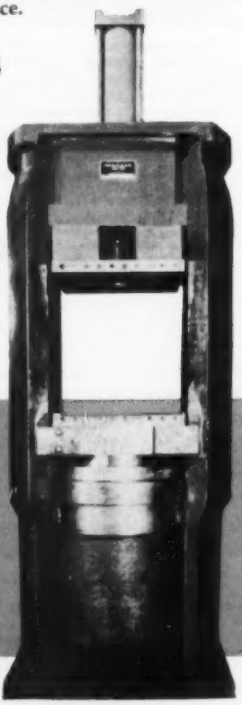


MILLS

An 84" Individual Mill equipped with a mixing apron. ADAMSON UNITED Mills may be had in all sizes from 6" x 16" to 28" x 84", driven individually; in pairs with right angle reducer between the units, or grouped on a line shaft with reducer at one end of the shaft. Apron, as shown, can be installed on any type of existing mill. New catalog No. 463 on request.

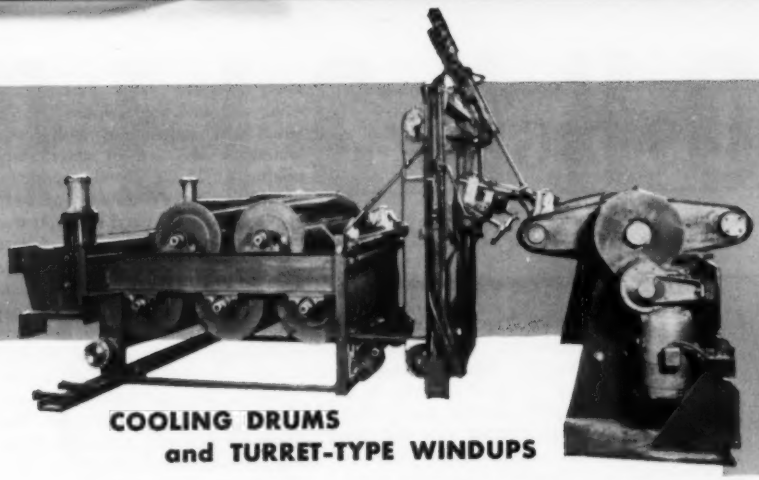
PRESSES

We build all types of presses for the rubber, plastics and plywood industries. Shown is a new 24" ADAMSON UNITED BARREL TYPE PRESS with transfer cylinder. This new press, an exclusive ADAMSON UNITED development, exerts up to 76% more platen pressure than conventional types without change in present hydraulic lines. Stock is transferred into the mold cavities through sprues which reduces cure time and flash trimming to a minimum. Sizes range from 12" through 32" with larger sizes available to specification. Presses Catalog No. 462 on request.



AUTOCLAVES or VULCANIZERS

Built to specific requirements from 18 inches to 15 feet in diameter, any length, vertical or horizontal to withstand internal pressures as high as 1000 lbs.-per-square-inch. The Pot Heater shown is a vertical, cylinder-operated breech-door type. Write for Vulcanizer Catalog No. 461.



COOLING DRUMS and TURRET-TYPE WINDUPS

This is a standard type of accessory equipment arrangement for plastics film. It consists of embossing equipment; cooling unit; slitting devices; compensator stand and automatic turret windup. The turret windup stand is a center-drive-type with automatic indexing equipment, yardage counter, and adjustable tension control. We design and build entire calendering process systems including all accessory equipment.

PRODUCTION UNITS

..... ADAMSON UNITED

BRAKE and TIRE TESTING MACHINES

Installation shows an 84" Adamson United High-Speed Jet Airplane Brake and Tire Testing Machine of the inertia type. We have built similar machines as large as 16 feet in diameter for speeds up to 250 M.P.H. and tire loads to 150,000 pounds.

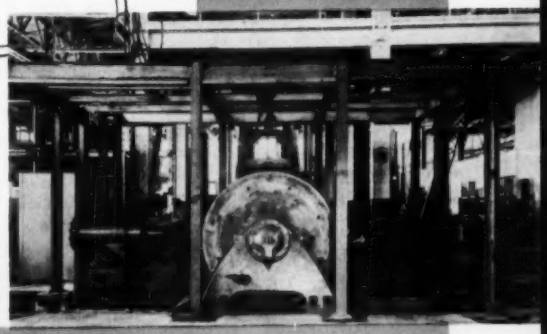
Wire, phone or write us today. No obligation.

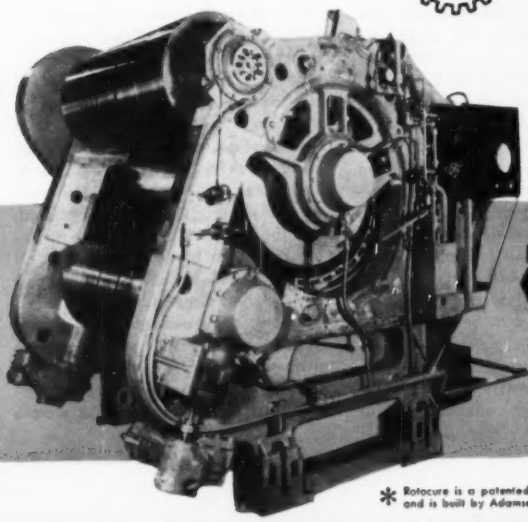
ADAMSON UNITED COMPANY

730 CARROL STREET • AKRON 4, OHIO

SALES OFFICES IN PRINCIPAL CITIES

Subsidiary of United Engineering and Foundry Company





ROTOCURE*

A new machine for the continuous curing of all flat rubber or plastics articles with smooth or designed surfaces. Rotocure increases production through continuous operation without opening, cooling, reheating and closing. It eliminates overcuring or undercuring of the over-lap areas occurring on conventional presses. Roll and belt changes, incident to design requirements, can be made on this new 60" x80" Rotocure in one-tenth the time formerly required.

* Rotocure is a patented development of Boston Woven Hose and Rubber Co. and is built by Adamson United Co. under a licensing arrangement.

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed.

General

CHEMICALS IN FOODS: A REPORT TO THE ASSOCIATION OF FOOD AND DRUG OFFICIALS ON CURRENT DEVELOPMENTS. A. J. Lehman. Association of Food & Drug Officials of the United States *15*, 82-9 (July 1951). The ingredients of plastic films are classified for use in food packaging materials. Those placed in the *suitable* group have passed satisfactorily either the solubility or toxicity tests or both. At the same time, the fact that certain of the plastic ingredients are classified as suitable should not imply that they may be used in unlimited quantities. Suitability means that under the conditions of use and in the amounts now employed to produce a finished film, the components in this class have such a low order of solubility as to be insignificant as a food contaminant when weighed in the light of the toxicological evidence. Any considerable variations from the present formulations would call for a reappraisal. An *unsuitable* list is added also in order to give as complete a representation of the problem as possible. Lists are given for resins, plasticizers, stabilizers, colorants and antistatics. The following resins are listed as suitable: polyvinyl chloride, polyvinyl acetate, polyvinyl chloride-acetate, polyvinylidene chloride, polystyrene, polyethylene, cellulose acetate, regenerated cellulose, copolymer of terephthalic acid and ethylene glycol, and butadiene-acrylonitrile (Perbunan and Hycar) synthetic rubber. The following plasticizers are listed as suitable: ethyl phthalyl ethyl glycolate, *p-tert*-butyl phenyl salicylate, 3-(2-xenoxyl)-1, 2-epoxypropane, ethylhexyl diphenyl phosphate, butyl phthalyl butyl glycollate, glycerol monooleate, acetyl tributyl citrate, and di-isobutyl adipate.

PLASTICS. G. M. Kline and R. B. Seymour. Ind. Eng. Chem. *44*, 2339-43 (Oct. 1952). The increasing utilization of plastics in the chemical engineering field has been a significant factor in the 60% growth in production of plastics since 1949. Polytheylene bottles and film are providing a light-weight, shatterproof, and corrosion-resistant packing medium. Hoods, ducts, tanks, piping, and fittings made of unplasticized polyvinyl chloride are now available from at least four firms in this country. A tough construction material made of glass fibers and polyester resins has proved to be eminently satisfactory for tanks, pipe, and other parts of chemical plant equipment. New plastic materials that are helping to meet the corrosion problems of the chemical industry are epoxy resins, acrylonitrile copolymers, polymethyl alpha-chloroacrylate, and styrene-butadiene copolymers and blends. 196 references.

Materials

PLASTICIZERS FROM LACTIC ESTERS AND DIBASIC ACIDS. C. E. Rehberg, T. J. Dietz, P. E. Meiss, and M. B. Dixon. Ind. Eng. Chem. *44*, 2191-95 (Sept. 1952). Lactic acid can be made economically by the fermentation of agricultural wastes and by-products containing fermentable sugars. As part of a long-range program intended to develop the industrial utilization of lactic acid, many dicarboxylic acid derivatives of lactate esters were screened to determine their suitability as plasticizers. Primary evaluation of numerous high boiling diesters of lactic acid showed that most of the esters were compatible with polyvinyl chloride and with cellulose acetate. Many of the esters were more efficient than di-2-ethylhexyl phthalate as plasticizers for polyvinyl chloride. The esters that appear to be of most interest as plasticizers for vinyl chloride copolymer are the adipates and sebacates of the butyl and octyl lactates. The direct esterification of alkyl lactates with dicarboxylic acids was also accomplished. In the reaction of adipic acid with butyl lactate, a mixture of esters was produced. These were separated, identified, and evaluated separately as plasticizers for vinyl resins. It was possible to control in large degree the proportions of these various esters in the product. A practical process was developed for the production of a high boiling, substantially neutral, light-colored mixture of esters which was an efficient plasticizer for the vinyl resin and did not require distillation before use. This process was readily adaptable to the use of other lactates and other dicarboxylic acids. The potential low cost of lactic acid, its ready availability, and the desirable properties of certain derivatives with dicarboxylic acids make these esters of interest to the plasticizer industry.

Properties

EFFECTS OF MOISTURE AND MILDEW ON ELECTRONIC EQUIPMENT. J. M. Leonard. Elec. Manuf. *50*, 98-103, 316, 318, 320 (Sept. 1952). The laboratory and field methods of test for evaluating the fungi resistance of plastic insulating materials and coatings are described and compared. The fungi resistance of plastics and plasticizers and the effect of fungicides are reviewed.

TENSILE PROPERTIES OF NEWER FIBERS. J. H. Dillon. Ind. Eng. Chem. *44*, 2115-24 (Sept. 1952). Stress-strain curves to rupture are presented for single fibers of viscose rayon, acetate rayon, nylon, Orlon, Dacron, dynel, Acrilan, X-51, Vicara, and regenerated silk. The relative stress-strain behavior of these fibers is discussed in terms of their chemical structures, and the limitation of this type of evaluation is stated. Repeated stress-strain data are presented in the form of "cycling profiles," and the viscoelastic properties of the various fibers thus revealed are compared. The effects of fiber morphology upon mechanical properties are discussed, and the effects of crimp on the measured Hookean modulus are given and interpreted. It is shown that a number of man-made fibers, compared with cotton, wool, and silk fibers, show a wide range of mechanical properties when examined by conventional stress-strain and relaxation tests, analyzed by the simple

* Reg. U.S. Pat. Off.

REICHHOLD

WE RESIST WEAR, WE'RE STRONG AND LIGHT, BECAUSE WE'RE MADE WITH...

LAMINITE

THE POLYESTER YOU SHOULD TRY, FRESH FROM THE LABS OF RCI!

CHEMICALS

● It's a fact . . . today's reinforced plastics manufacturers are using LAMINITE 100, RCI's new general purpose rigid thermosetting polyester resin, reinforced with suitable fillers, to turn out a wide variety of products ranging from tote boxes to tea trays . . . from lampshades to luggage. For complete information regarding this clear amber liquid polyester which features good initial tack, fast cure, essential high temperature strength and excellent styrene compatibility, just telephone or write our Specialty Resins Division.

REICHHOLD CHEMICALS, INCORPORATED
630 Fifth Avenue, New York 20, New York

RCI

Creative Chemistry...Your Partner in Progress

Plants: Detroit, Mich. • Brooklyn, N.Y. • Elizabeth, N.J. • South San Francisco and Azusa, Calif. • Tuscaloosa, Alabama • Seattle, Wash. • Chicago, Illinois Charlotte, N.C. • Jacksonville, Florida • Liverpool, England • Paris, France • Sydney, Australia • Hamburg, Germany • Naples, Italy • East London, South Africa Barcelona, Spain • Wernderf, Austria • Buenos Aires, Argentina • São Paulo, Brazil • Sassenheim and Apeldoorn, Holland • Toronto, Port Moody, and Montreal, Canada • Osaka, Japan • Gothenburg, Sweden • Zurich, Switzerland

Plastics for Defense and Industry

KNOW HOW — The "know how" approach to every phase of plastics engineering and production is, and continues to be, a major factor in the over quarter-century success of the Michigan Molded organization. It is one of many reasons that Michigan Molded's recommendations and performance in doing a plastic job well — justifies the continuing interest and confidence of America's users of all types of plastics.

MICHIGAN MOLDED PLASTICS, INC. DEXTER, MICHIGAN

Offices in Principal Eastern and Midwestern Cities.

cycling profile method presented. The importance of morphological factors in determining mechanical behavior is demonstrated, particularly the perturbing effect of crimp on the measured Hookean modulus of nylon, Dacron, and wool fibers.

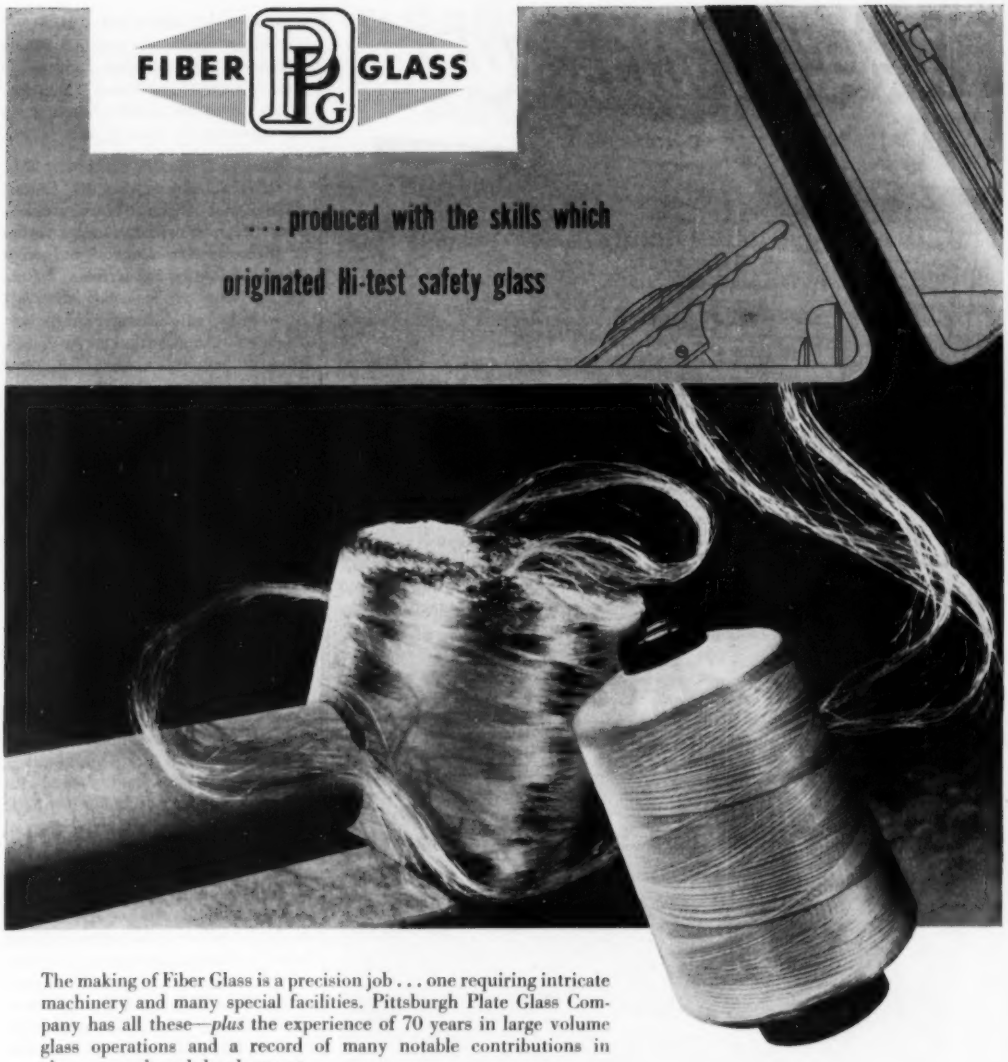
INFLUENCE OF MOLECULAR STRUCTURE ON PROPERTIES. H. Mark. Ind. Eng. Chem. *44*, 2110-14 (Sept. 1952). The following factors appear to be of particular significance for the development of good fiber-forming properties of a polymer: Average molecular weight should not be too low, because tensile strength, elongation to break, and resistance against abrasion and fatiguing decrease sharply as the degree of polymerization of the material becomes too low. Present experience indicates that too low molecular weight fractions cause brittleness, whereas too high molecular weight constituents can be responsible for difficult processing in filtration, deaeration, and spinning. A tendency to form areas of crystalline character on stretching, slashing, or drawing is of importance in obtaining a compromise between tensile strength, transversal properties, and break elongation. Strong and regularly distributed intermolecular force centers, stiff segments in the chains, and symmetric arrangements of the substituents favor the tendency for crystallization. High softening point, low brittle point, and a high resistance against the attack of chemicals, oxygen, light, and micro-organisms are also essential.

Testing

FATIGUE MACHINES FOR LOW TEMPERATURES AND FOR MINIATURE SPECIMENS. W. N. Findley, P. G. Jones, W. I. Mitchell, and R. L. Sutherland. ASTM Bulletin No. 184, 53-5 (Sept. 1952). The design and features of the following new types of fatigue testing apparatus are described: 1) A high-speed rotating-beam fatigue machine designed for operation at temperatures as low as -320° F. This machine employs a vertical spindle and has a device for adjusting the alignment of the specimen. 2) A repeated-bending fatigue machine for tests at temperatures as low as -320° F. This machine was equipped with a device to permit tests in bending, torsion, or combined bending and torsion. Various mean stresses

FIBER PPG GLASS

. . . produced with the skills which originated Hi-test safety glass



The making of Fiber Glass is a precision job . . . one requiring intricate machinery and many special facilities. Pittsburgh Plate Glass Company has all these—*plus* the experience of 70 years in large volume glass operations and a record of many notable contributions in glass research and development.

Today, for example, Pittsburgh's Hi-Test Safety Glass is the standard in many automobiles—the result of exhaustive research which originated the lamination of glass with an interlayer of vinyl plastic and devised methods which made volume production practicable.

Now these skills are backing up the production of Fiber Glass, assuring both excellence of product and the efficient handling of users' requirements. If Fiber Glass is used in your products—either Superfine Insulation or Yarns, Strands or Roving—investigate the advantages which can be obtained by specifying "*Pittsburgh*"—PPG Fiber Glass. Pittsburgh Plate Glass Company, Fiber Glass Division, 632 Duquesne Way, Pittsburgh 22, Pa.

engineering service available

Opportunities for improving products or production methods involving the use of PPG Fiber Glass are so great that our field engineers may be able to contribute information of value to you. Arrangements for this service, or for obtaining data on PPG Fiber Glass, may be made through our executive offices in Pittsburgh, or our district sales offices in Detroit, New York, Cleveland, Chicago, Cincinnati and Washington.

FIBER PPG GLASS PAINTS · GLASS · CHEMICALS · BRUSHES · PLASTICS

PITTSBURGH PLATE GLASS COMPANY

Now, on one handy chart
(8½" x 5½") Color Codes, Calibration Symbols,
Thermo Elements of Thermocouple and Extension Wires for ISA,
U.S. Military and Aeronautical Specifications — Plus — Resistance Tables.

Write Today for your copy. No obligation, of course.

Thermo Electric Co., Inc.
FAIR LAWN, NEW JERSEY

This, believe it or not, is a plastic horn!

Metallizing made it glitter, made it a bestseller. If you want effects like these . . . metallic effects mass-produced at the lowest unit cost, see Metaplast, the industry's foremost pioneer in metallizing on plastics, metal and glass.

Metaplast
PROCESS, Inc.
PIONEERS OF MASS-PRODUCED METALIZING

Tel. HAvemeyer 6-9843

FACTORY & OFFICE: 34-51 56th St., Woodside, L. I. 77, N. Y.

may also be employed. 3) A repeated-bending fatigue machine equipped with suitable fixtures to permit tests of miniature specimens ¾ in. long in either bending or torsion.

VIBRATING-PLATE VISCOMETER. J. G. Woodward. Electronics *25*, 98-100 (Feb. 1952). A direct reading viscometer capable of measuring values of viscosity times density (centipoises X grams/ml.) from 0.1 to 100,000 with an accuracy of ±5% is described. Indefinitely large volumes down to 0.5 ml. can be measured as long as a thin flat plate can be immersed.

Applications

INDUSTRIAL APPLICATIONS OF FIBERS. H. S. Grew, Jr. Ind. Eng. Chem. *44*, 2140-44 (Sept. 1952). A comparison is made between the newer synthetic fibers and cotton with respect to their importance in industrial textile applications. It is shown that one inherent advantage of synthetic fibers is that they can be produced with precise uniformity. In a review of industrial applications of these fibers, the rubber industry stands out in importance because of its exacting fabric requirements for tires, mechanical hose and belting, and a variety of coated products. Another significant use for synthetic fabrics is in the reinforcement of plastic laminates. The chemical and allied industries also use the new fabrics for filter media, anode bags, and electrolytic cell diaphragms. The varying conditions and requirements found in these applications are discussed in some detail. In these and other fields, it is the task of the textile technologist to use his knowledge of the fundamental properties and characteristics of all available fibers to make the correct selection for each specific end use.

PLASTICS REVOLUTIONIZE TELEPHONE EXCHANGE SWITCHBOARD. Brit. Plastics *25*, 112-14 (Apr. 1952). Acrylic, polyvinyl chloride, molded and laminated phenolic, and cellulose acetate plastics are used in the construction of an English telephone exchange switchboard.

NEW PRINTING PROCESS AIDS THE BLIND. Plastics (London) *17*, 224-5 (Aug. 1952). An automatic process for printing in Braille is described. This system uses a plastic material

to produce solid dots instead of the usual raised dots on the paper. Although several types of plastics can be used, urea-formaldehyde resin plasticized with an ester of abeitic acid is being used at present.

ELECTRICAL INSULATING TAPES IN SMALL APPLIANCES. T. Ulrich. Elec. Manuf. *50*, 96-7, 304 (Sept. 1952). Three basic types of electrical insulating tapes have been adopted by many manufacturers with substantial savings in time and money. These are (1) purified crepe-paper tape; (2) polyvinyl chloride tape, and (3) glass-cloth tape with thermosetting adhesive.

MOLDING VALVE-HOLDERS IN PTFE. Brit. Plastics *25*, 268 (Aug. 1952). The molding of electron tube bases from polytetrafluoroethylene is described. The charge of granulated resin is weighed to the nearest 0.1 gram, preformed at 200 p.s.i., sintered in an oven at 360° C., and then pressed at 330° C. in a coin press.

PRECISION MOLDINGS FOR THE TEXTILE INDUSTRY. A. Beecham. Brit. Plastics *25*, 257-61 (Aug. 1952). The manufacture of precision parts from plastics for the textile industry is described in detail. The operations considered include choice of material, molding, machining, finishing, assembly, and inspection.

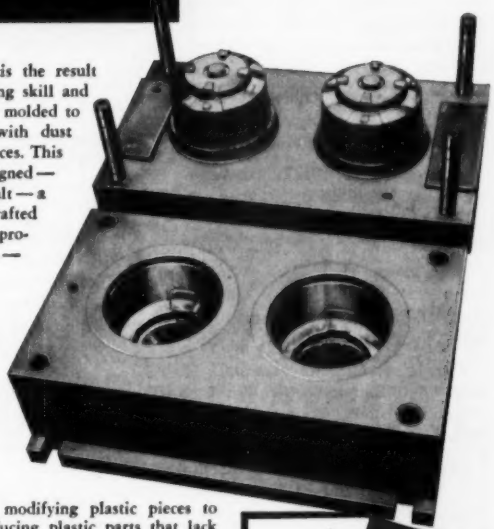
Molding and Fabricating

ELECTROSTATIC FLOCKING OF PLASTIC SURFACES. E. Escales. Kunststoffe *42*, 61-4 (Aug. 1952). Mechanical or electrostatic flocking is a useful finishing process for plastics. After coating with a special adhesive, depending on the kind of plastic surface, short textile fibers are applied with a gun. The result is a suede or velour-like finish which is resistant to abrasion and water. The effect of the coatings can be varied by simultaneous embossing or printing. New technical as well as decorative effects are obtained when the textile fibers are replaced by powdered materials such as metal, graphite, mica, glass, or emery.

NEW FRONTIERS FOR PVC WELDING. Brit. Plastics *25*, 250-6 (Aug. 1952). Recent developments in the heat sealing of polyvinyl chloride plastic film and sheeting are described. Techniques, equipment, and several production and difficult applications are included in this review.

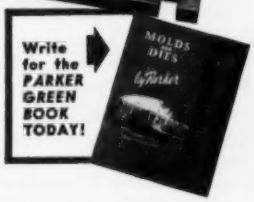
THERE'S NOTHING QUICK... ABOUT A *Flash!*

. . . when its removal is costly and time consuming! — A molded plastic product is never better than the mold that produces it!



This motor housing is the result of Parker mold making skill and craftsmanship. It was molded to fit the components with dust tight, *air tight* tolerances. This mold was Parker designed — Parker built. The result — a product of hand crafted quality from efficient production line methods — every time!

Polishing, trimming, modifying plastic pieces to fit an assembly, producing plastic parts that lack uniformity . . . all are indicative of *expensive* economy. You can eliminate these wasteful practices *only* by using a mold painstakingly engineered to the highest degree of perfection. The craftsmen at Parker apply proven skill and technical knowledge to produce just such a superlative product. If you require unwavering fidelity of reproduction and perfectly formed finished plastic products, it will pay you to investigate the flexibility of Parker's facilities.



THE PARKER STAMP WORKS, INC.
PLASTIC MOLD DIVISION
by Parker
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D.C., at 25¢ each.

INSERTS. L. N. Brutus. U.S. 2,607,956, Aug. 26. Inserting a plastic plug in a metal threaded bolt.

COMPOSITE. E. L. Danielson and F. J. Dofsen. U.S. 2,607,957, Aug. 26. For forming a composite plastic structure.

LOG DEBARKER. H. J. Eklund and C. W. Miller (to D. J. Murray). U.S. 2,608,224, Aug. 26. Log barker comprising a log support, means for rotating and advancing a log resting upon said support and a power-driven barking rotor, and spaced coaxial disks having taut chains therebetween.

CLOSURES. L. T. Knocke. U.S. 2,608,334, Aug. 26. Applying and forming thermoplastic container closures.

LAMINATE. C. J. Straka (to Westinghouse). U.S. 2,608,499, Aug. 26. Glass fabric laminates with phenyl methyl siloxane binder.

HONEYCOMB. H. R. Merriman (to Glenn L. Martin). U.S. 2,608,502, Aug. 26. Phenolic resin-impregnated fabric honeycomb.

WALL PANEL. H. Meyer and B. M. Walkey (to Motion Picture Research Council). U.S. 2,608,504, Aug. 26. Cellulose-ether surfaced wall panel.

CELLULAR RESINS. R. F. Sterling (to Westinghouse). U.S. 2,608,536, Aug. 26. Cellular thermoset resins.

COATING. D. Aelony (to General Mills). U.S. 2,608,538, Aug. 26. Rosin acid ester-modified phenolic resin.

CERAMIC COATING. L. A. Bain, Jr., and H. E. Malone (to Western Electric). U.S. 2,608,539, Aug. 26. Conductive coating comprising silver particles, lead borosilicate, oil-modified alkyd resin, and solvent.

ADHESIVE. B. W. Pare and A. F. Pare, U.S. 2,608,540, Aug. 26. Adhesive of cellulose acetate and polyvinyl alcohol-acetate.

POLYMERS. J. E. Troyan and L. R. Sperberg (to Phillips Petroleum). U.S. 2,608,541, Aug. 26. Incorporating rosin acid in polymeric materials.

ADHESIVES. R. L. Smith and C. M. Wiswell (to S. D. Warren). U.S. 2,608,542-3, Aug. 26. Heat-energizable adhesives.

SILOXANE. E. L. Warrick (to Dow Corning). U.S. 2,608,545, Aug. 26. Siloxane putty.

MELAMINE. E. F. Jackson (to Monsanto). U.S. 2,608,546, Aug. 26. Condensate of melamine, formaldehyde, and salicylic acid.

VINYL RESINS. J. G. Hendricks and H. J. Ratti (to National Lead). U.S. 2,608,547, Aug. 26. Vinyl halide resin stabilized with lead phthalate.

POLYMERS. C. W. Tullock (to Du Pont). U.S. 2,608,548, Aug. 26. N-carboanhydrides of alpha amino acids and polyamides.

INTERPOLYMERS. R. J. Wolf (to B. F. Goodrich). U.S. 2,608,549, Aug. 26. Interpolymers of vinyl chloride, higher alkyl acrylate, and dialkenyl ester of olefinic dicarboxylic acid.

POLYMERS. C. S. Rowland and A. G. Chenicek (to Interchemical). U.S. 2,608,550, Aug. 26. Reaction products of unsaturated dicarboxylic acid derivatives with cyclopentadiene polymers.

COPOLYMERS. P. G. Benignus (to Monsanto). U.S. 2,608,551, Aug. 26. Fungistatic copolymers of butadiene-1, 3 and organic nitriles.

INTERPOLYMERS. R. J. Wolf and A. A. Nicolay (to B. F. Goodrich). U.S. 2,608,552-3, Aug. 26. Interpolymers of vinyl chloride, and a higher alkyl acrylate with an acrylic nitrile or a divinyl aryl hydrocarbon.

CATALYSIS. O. H. Bullitt, Jr. (to Du Pont). U.S. 2,608,554-5, Aug. 26. Alkaline catalysis of acrylonitrile or methyl methacrylate.

TUBING. W. E. Meissner, U.S. 2,608,720, Sept. 2. Apparatus for forming tubing from thermoplastic sheet.

MOLDING. E. E. Heinzelman (to Armstrong Cork), U.S. 2,608,721, Sept. 2. Molding machine.

HONEYCOMB. T. P. Pajak (to Glenn L. Martin). U.S. 2,609,068, Sept. 2. Honeycomb structure bonded with thermosetting adhesive.

PULVERIZATION. R. E. Bludean (to Carbide and Carbide). U.S. 2,609,150, Sept. 2. Device for chilling tough thermoplastics with liquid nitrogen and pulverizing.

GLARE SCREEN. J. D. Ryan and P. T. Mattimoe (to Libbey-Owens-Ford). U.S. 2,609,269, Sept. 2. Safety glass bonded with dyed polyvinyl resin layer.

ABRASIVE. L. R. Nestor (to Minnesota Mining). U.S. 2,609,284, Sept. 2. Coated abrasive including as binders, starch, sodium silicate, and phenol-formaldehyde resins.

CELLULOSE TRIACETATE. H. Jones and J. K. Aiken (to Geigy). U.S. 2,609,304, Sept. 2. Cellulose triacetate plasticized with a chlorinated cyclic acetal.

WOOL TREATMENT. L. A. Fluck and J. A. Lynn (to American Cyanamid). U.S. 2,609,307, Sept. 2. Treating wool with acid aminotriazine resin colloids.

HONEYCOMB. H. C. Engle, W. W. Troxell and T. P. Pajak (to Glenn L. Martin). U.S. 2,609,314, Sept. 2. Phenolic-impregnated fabric honeycomb.

SEALING DEVICE. E. C. Fichtner (to Wells Manufacturing). U.S. 2,609,316, Sept. 2. Device for thermosealing thermoplastics.

SEALING DEVICE. C. W. Vogt. U.S. 2,609,317, Sept. 2. Method for sealing thermoplastics.

PIPE. H. E. Boge (to Mathieson). U.S. 2,609,319, Sept. 2. Laminated glass cloth polyester resin piping.

COATING. D. G. Patterson (to American Cyanamid). U.S. 2,609,321, Sept. 2. Craze-resistant urea or melamine coatings.

SPONGE MATERIAL. C. L. Wilson. U S. 2,609,347, Sept. 2. Sponge from polyvinyl alcohol and formaldehyde.

ALKYD RESIN. R. N. DuPuis and H. J. Wright (Association of American Soap and Glycerine Producers). U.S. 2,609,348, Sept. 2. Short-oil alkyd resin.

RESIN. W. E. Cass (to General

The Super High-Speed machine you have been waiting for

THE DOWDING

AUTOMATIC *FAST-CYCLING*

INJECTION MOULDING MACHINE

- Fully automatic and foolproof
- Fast plasticizing at unusually low injection presssure
- 3 zone cylinder heating
- Vickers hydraulic equipment
- Automatic lubrication
- BRITISH MADE
- Built to American screw thread standards
- Early delivery

SPECIFICATIONS

Cycles per hour (maximum)	1200
Material plasticized per hour (dependent upon shot size and material)	22 lb.
Maximum weight per shot (acetate)	2 oz.
Area of injection plunger	2.074 sq. in.
Pressure on material at end of plunger	9100 lb./sq. in.
Total pressure on injection plunger	18850 lb.
Mould opens (adjustable)	9 in.
Maximum die space	7 in.
Minimum die space	3 in.
Maximum recommended casting area in mould	15 sq. in.
Size of die plates	15 x 16 in.

DOWDING & DOLL LTD
CABLES
GREYCOAT STREET, LONDON, S.W.1
ACCURATOOL, LONDON

Electric.) U.S. 2,609,349, Sept. 2. Resins from styrene, castor oil, and a diisocyanate.

TEXTILE FINISHING. C. Spatt (to General Aniline). U.S. 2,609,350, Sept. 2. Resinous material from maleic anhydride, polyvinyl alcohol, and a polymerizable monomer.

CASTINGS. W. J. Taat and R. W. van Korndorffer (to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek). U.S. 2,609,351, Sept. 2. Phenol formaldehyde-maleic anhydride casting resin.

METHYLOL PHENOL COMPOSITIONS. H. M. Kvalnes (to Du Pont). U.S. 2,609,352, Sept. 2. Polymethylol phenols.

RESINS. L. C. Rubens and R. F. Boyer (to Dow). U.S. 2,609,353, Sept. 2. Compositions of styrene, unsaturated alkyd resin, and elastomer.

RESINS. O. L. Polly (to Union Oil). U.S. 2,609,354, Sept. 2. Modified resins from polystyrenes and esters of saturated dicarboxylic acids and unsaturated alcohols.

VINYL HALIDES. D. E. Winkler (to Shell). U.S. 2,609,355, Sept. 2. Stabilization of vinyl halide polymers with unsatisfactory polyesters.

RESINS. E. B. Bengtsson (to Aktiebolaget Bofors). U.S. 2,609,356, Sept. 2. Sulfonamide resins.

RESINS. J. E. Koroly (to Rohm and Haas). U.S. 2,609,357, Sept. 2. Reacting a diepoxide of a glycol bis-exodihydrodicylopentadieney ether with a polycarboxylic acid.

RESINS. H. F. Pfann and E. L. Kropa (to American Cyanamid). U.S. 2,609,358, Sept. 2. Alkyd resins produced through the use of a polymerized alcohol.

COPOLYMERS. W. J. Sparks and D. W. Young (to Standard Oil). U.S. 2,609,359, Sept. 2. Copolymers of a polyene, an alkene, and an olefinically unsaturated aromatic hydrocarbon.

POLYVINYL ALCOHOL. G. C. Daul and J. D. Reid (to United States). U.S. 2,609,360, Sept. 2. Reacting polyvinyl alcohol with urea phosphate.

RESINS. G. S. Schaffel (to General Tire and Rubber). U.S. 2,609,361, Sept. 2. Resins containing chloro-isopropenyltoluene.

COPOLYMERIZATION. L. M. Welch (to Standard Oil). U.S. 2,609,363, Sept. 2. Copolymerization of divinyl benzene and isobutylene.

POLYMERS. A. O. Zoss (to General Aniline). U.S. 2,609,364, Sept. 2. Rubberlike polyvinyl N-butyl ethers.

POLYCHLOROPRENE. G. W. Scott (to Du Pont). U.S. 2,609,365, Sept. 2. Chlorinated polychloroprene latex.

POLYMERIZATION. F. F. Fryling and J. E. Troyan (to Phillips Petroleum) U.S. 2,609,366, Sept. 2. Use of methanol in emulsion polymer.

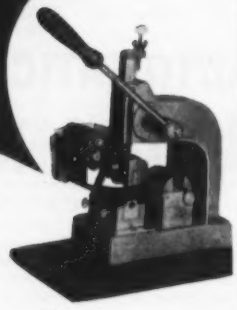
CARBOHYDRATES. K. M. Gaver (to Ohio State University). U.S. 2,609,368, Sept. 2. Reacting glycopyvanose polymers with alkali metal alcoholate.

THERMOPLASTIC WELDING. L. L. Young (to Padevco). U.S. 2,609,482, Sept. 2. High frequency welding of thermoplastic sheet.

SHEET EMBOSSING. R. E. Getchell (to B. F. Perkins). U.S. 2,609,568, Sept. 9. Method of embossing thermoplastic sheet.

CASTING. E. L. Danielson and F. J.

It makes a Good Impression



Apex Leaf Stamping Machine imprints trade-names, designs, etc. in gold, silver or any other color on all thermoplastic moldings

Dollar for dollar Apex Leaf Stamping Machines give you cleaner, more uniform decorating on plastics, leather, wood, etc., than any other method. Unskilled operators produce one thousand and more perfectly decorated pieces per hour at a cost of *a fraction of a cent each!*

Model E-61W, featuring foolproof automatic leaf feeding, costs only $195, FOB N.Y. Write for details.

APEX MACHINE MANUFACTURING CORP.
14-13, 110th St. College Point 56, N.Y.
Largest and Oldest Mfrs of Multi-Color Ink and Hot Stamping Machines

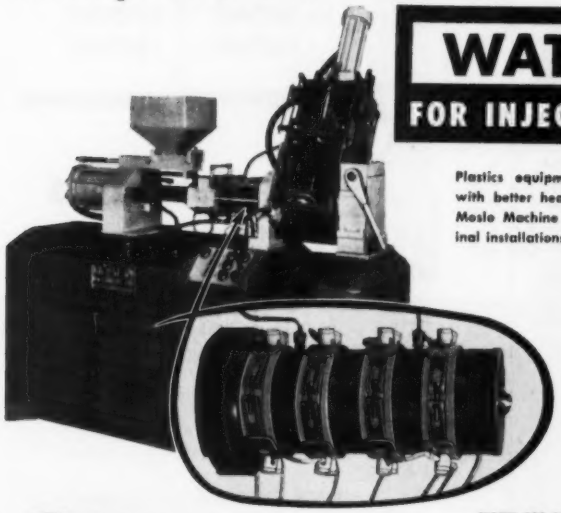
In Stock—
SHEETS-ROLLS
OR CUT TO YOUR ORDER

- **Cellulose Acetate**
  All Thicknesses Up To .250 Clear Transparent, Matte, Opaque, Translucents - Colors. Sheets - 20x50", 25x40", 40x50", Or Cut To Any Size Or Shape To Fit Your Needs. Rolls 20" and 40" By Any Length.
- **Plexiglas** All Thicknesses
  .060 To 3.000 Clear Transparent & Colors. Sheets 24x36", 36x60", 40x50", 48x72"
- **Vinylite** .010 to .125 Clear
  Transparent, Matte-Colors. Sheets 20x50" Only
- **Cellophane**

Sheets — Rolls — Ribbon — Cellulose Tape

TRANSILWRAP CO.
2814-18 W. Fullerton Ave., Chicago 47, Ill.
Dickens 2-2616

Why Moslo Chose . . .



WATLOW NARROW-BANDED HEATING UNITS FOR INJECTION MOLDING MACHINES

Plastics equipment manufacturers know that better plastic molding begins with better heat control. That's why more and more manufacturers—like the Moslo Machine Co. of Cleveland, Ohio—are using Watlow units in their original installations. The reasons:

RATINGS AS HIGH AS 45 WATTS/SQ. IN.

Compact, lightweight design for quick-responding heat concentration . . . minimum temperature lag.

GREATER FLEXIBILITY

Individual bands can be conveniently built up into groups, uniformly distributed in three phases for series, parallel and y-delta connections—as the heat needs dictate. Single burnouts mean minimum down-time and interruption.

LONGER LIFE

Narrow band construction, plus patented clamping band design, assure close contact at all temperatures. This means maximum heat transfer . . . lower internal operating temperature. Results: longer life, fewer burnouts.

WRITE FOR FREE CATALOG Strips, bands, cartridges, immersion heaters.

WATLOW

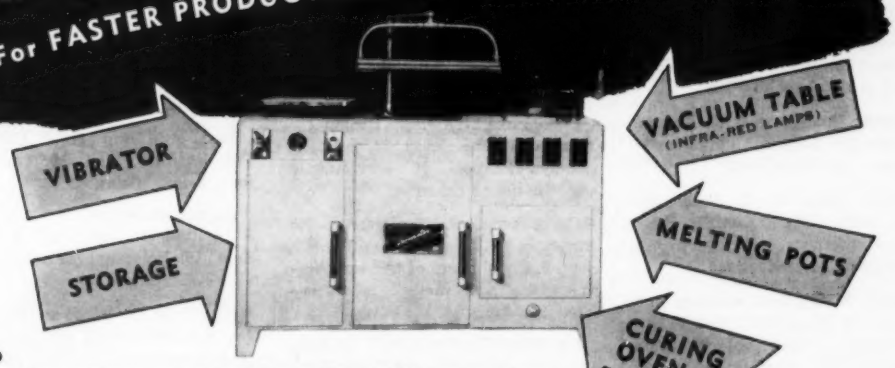
SINCE 1922—DESIGNERS AND MANUFACTURERS OF ELECTRIC HEATING UNITS

ELECTRIC MANUFACTURING CO.

1364 FERGUSON AVENUE

SAINT LOUIS 14, MISSOURI

The VACURATOR . . . A NEW "5 IN 1" UNIT For FASTER PRODUCTION ON PATTERNS & SAMPLES!



Cut time and money costs from your schedule with this compact, functional unit. At your fingertips is the complete equipment for fast production of patterns and samples from original models. You can make the exact cavity you need for either metal or plastic sample production . . . and with no delay.

High and low temperature melting pots, vibrator, vacuum table, curing oven, and infra-red lamps . . . all under exact electrical control.

For More Information Write or Call:

GUY P. HARVEY and SON Corp.
LEOMINSTER, MASSACHUSETTS, U. S. A.

Surface

PYROMETERS

for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for batch temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.

Send for Bulletin 194SA.

CAMBRIDGE INSTRUMENT CO., INC.
3711 Grand Central Terminal
New York 17, N. Y.

CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

Moisture Indicators and Recorders • Physical Testing Instruments • Laboratory Instruments for A. C. & D. C. • Galvanometers Engineering Instruments • Gas Analysis Equipment • Physiological Instruments and many other Mechanical and Electrical Instruments

RC PLASTISOLS
for DIPPING • MOLDING
CASTING • COATING

RUBBER CORPORATION OF AMERICA

RC PLASTICIZERS

- Dibutyl Phthalate—DBP)
- Triethylene Glycol Dicaprylate—TG-8)
- Di-iso-octyl Phthalate—(DIOP)
- Di-iso-octyl Adipate—(DIOA)
- Iso-octyl Palmitate—(0-16)
- Iso-Decyl Phthalate—(RC-400)

We maintain a fully equipped laboratory and free consulting service.

RUBBER CORPORATION OF AMERICA

274 Ten Eyck Street, Brooklyn 6, N. Y.
111 West Monroe Street, Chicago 3, Ill.

SALES REPRESENTATIVES: Ernest Jacoby & Co., 79 Milk St., Boston 9, Mass.; Charles Larkin II, 250 Delaware Ave., Buffalo 2, N. Y.; H. L. Blachford, Ltd., 977 Aqueduct St., Montreal 3, Canada; Ernesto Del Valle, Talsa, 64, Mexico, D. F.

Dofsen. U.S. 2,609,570, Sept. 9. Mold for casting a multipart plastic article.

BAG SEALER. C. M. Williamson and E. D. Boisselier (to Sears, Roebuck). U.S. 2,610,137, Sept. 9. Tool for heat-sealing thermoplastic bags.

FIBER STRUCTURE. C. C. Heritage (to Wood Conversion). U.S. 2,610,-138, Sept. 9. Web of wood fibers bonded with phenolic resin.

MOLDING COMPOSITION. R. Kreton. U.S. 2,610,159, Sept. 9. Molding compositions from horn meal.

DRYING OILS. O. L. Polly (to Union Oil). U.S. 2,610,161, Sept. 9. Copolymerizates of drying oils with styrene or derivatives.

RESINS. E. W. Gluesenkamp and J. Dazzi (to Monsanto). U.S. 2,610,-164-5, Sept. 9. Vinyl chloride resin plasticized with aromatic sulfonated alkane esters.

STABILIZERS. T. F. Anderson (to Libbey-Owens-Ford). U.S. 2,610,168, Sept. 9. Polyesters stabilized with substituted p-benzoquinones.

POLYMERIZATION. J. F. Hyde and W. H. Daudt (to Dow-Corning). U.S. 2,610,169, Sept. 9. Polymerization of siloxanes.

CONDENSATES. L. A. Lundberg (to American Cyanamid). U.S. 2,610,170, Sept. 9. Petroleum sulfonates for preparing condensates in bead form.

CONDENSATES. A. S. Nyquist (to American Viscose). U.S. 2,610,174, Sept. 9. Beads of sulfonated phenolic resin.

COPOLYMERIZATION. G. E. Ham (to Monsanto). U.S. 2,610,173, Sept. 9. Copolymerization of acrylonitrile and vinylidene chloride.

COPOLYMERS. F. G. Pearson (to American Viscose). U.S. 2,610,174, Sept. 9. Copolymers of trifluorochloroethylene and methyl methacrylate.

CELLULOSE DERIVATIVES. E. D. Klug (to Hercules). U.S. 2,610,180, Sept. 9. Ethyl oxyethyl cellulose derivatives.

POLYMERS. M. Kosmin and J. M. Butler (to Monsanto). U.S. 2,610,202, Sept. 9. Esters of polymers of maleic anhydride and beta-mercaptoethanol.

HELMET. LeG. Daly. U.S. 2,610,322, Sept. 16. For production of a molded plastic helmet.

POLYVINYL ALCOHOL. W. R. Hatchard and J. W. Hill (to Du Pont). U.S. 2,610,359, Sept. 16. Polyvinyl alcohol filaments.

POLYVINYL ALCOHOL. E. T. Cline. P. S. Pinkney, L. Plambeck, and H. B. Stevenson (to Du Pont). U.S. 2,610,360, Sept. 16. Water-resistant polyvinyl alcohol filaments.

SEAL. P. M. Pope (to A. Kimball). U.S. 2,610,879, Sept. 16. Lock seal for plastic articles.

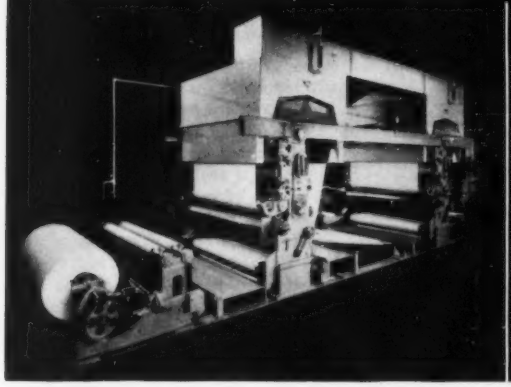
CELLULOSE ESTERS. G. C. Daul and J. D. Reid (to U.S.). U.S. 2,610,953, Sept. 16. Polyvinyl phosphoric acid esters of cellulose.

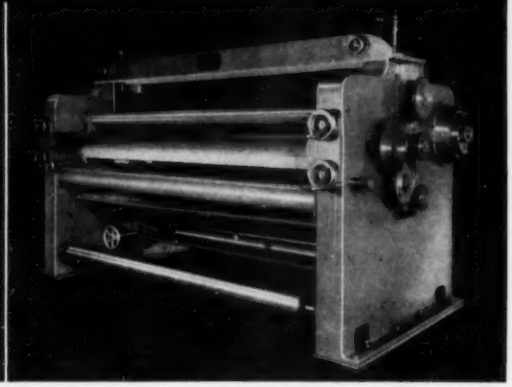
RESINS. M. DeGroofe and B. Keiser (to Petrolite). U.S. 2,610,955. Sept. 16. Derivatives of oxyalkylated phenol-aldehyde resins.

FIBROUS GLASS. R. Steinman and H. C. Courtright (to Owens-Corning). U.S. 2,610,957, Sept. 16. Glass fibers bonded with an acid salt of aluminum and an excess of phosphoric acid and an inorganic base and an organic resinous binder.

Paper *plus* + ...by SORG

...GRAVURE PRINTING...ANILINE PRINTING...COATING and TREATING





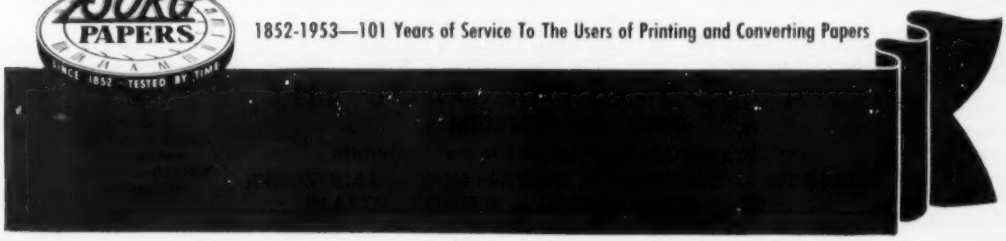
\+ For the past 101 years SORG has been a top name in the making of special papers. Now, to that ability to create specially-formulated base papers designed to meet your individual requirements, SORG has added these "PLUS mill services" — gravure printing, aniline printing, surface coating and saturating.

The PLUS of Gravure offers high speed, web-fed 2-color gravure printing on a wide range of base papers from strong industrial kraft to fine book paper. The PLUS of Coating offers precision application of synthetic resins, organosols, plastisols, and elastomers on a range of specially-formulated base papers with unusual accuracy of treatments.

When planning your product and packaging consider the advantages and economy of "Paper Plus ... by Sorg." Call in your nearest Sorg Representative for a consultation on your problems—or write Product Development, Dept. PX, of the Sorg Paper Company.

SORG PAPERS — SINCE 1852 - TESTED BY TIME

1852-1953—101 Years of Service To The Users of Printing and Converting Papers



BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Chemical Investments," by John F. Bohmfalk, Jr.

Published in 1952 by Chemonomics, Inc., 400 Madison Ave., New York 17, N.Y. 87 pages. Price $5.00.

The relationship between research and sales growth for major end-product groups in the chemical industry and for 20 leading companies in the field is interpreted in this volume. Rates of growth in specific areas of the chemical process industries, such as plastics, synthetic fibers, and medicinal and agricultural chemicals, are also examined in the light of research activity. The author outlines the competitive status of various companies in each of these areas.

The 20 chemical companies are surveyed from the standpoint of their research expenditures, sales growth, and earning capacities. The text also discusses the management of each company, its research activity, and its outlook. Past and current financial data for these companies are presented in an Appendix.

"Textile Chemicals and Auxiliaries," edited by Henry C. Speel.

Published in 1952 by Reinhold Publishing Corp., 330 W. 42 St., New York 36, N.Y. 493 pages. Price $10.00.

The role of chemicals, dyes, finishing agents, and auxiliaries in the modern textile industry is discussed in this volume. Written by a team of chemists and edited by a textile consultant, the text describes types of auxiliaries used in textile processing, their many applications in the field, and gives their identification by both trade name and chemical structure.

Part 1 begins with a discussion of the physical and chemical properties of natural, semi-synthetic and fully synthetic fibers—their types, properties, and behavior. Separate chapters then describe the general processes used in fabric preparation, dyeing and printing, and various types of finishing. This material serves as a background for the second part of the book which deals with such individual types of auxiliaries as water conditioners, fats and oils, starches, gums and glues, solvents, surfactants, and water-, flame-, and mothproofing agents. Latest developments in processing techniques for such new synthetic fibers as Dacron, Orlon, Dynel, X-51, Vicara, and Acrilan are discussed.

"Chemicals of Commerce," by Foster D. Snell and Cornelia T. Snell.

Published in 1952 by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N.Y. 520 pages. Price $6.50.

A review of the new chemicals, new developments in chemistry, and new materials of recent years is presented in this second edition. Practical data are given on a vast number of chemical materials—inorganic and organic, synthetic and natural, of vegetable, animal, and mineral origin—all chosen for their commercial importance. Facts are given as to the composition, properties, and uses of these materials. The book is written to meet the needs of the chemist, the chemical executive, the purchasing agent, and the plant manager.

X-ray analysis—The use of X-ray tools in scientific and industrial applications is described in this 8-page booklet entitled "Facts and Figures on Three Powerful X-Ray Tools for Non-Destructive Analysis." Diagrams show the principles on which the instruments operate. One is an X-ray source combined with film which receives diffracted rays from the specimen being analyzed. The second is an X-ray and Geiger counter combination used as a spectrometer. The third consists of X-ray plus an analyzing crystal and is used as a spectrograph. The booklet illustrates how a film diffraction unit consisting of the basic X-ray generator plus a camera can be converted to spectrometer and spectrograph use. Data are given on recommended fields of application. *Research & Control Instruments Div., North American Philips Co., Inc., 750 So. Fulton Ave., Mt. Vernon, N. Y.*

Process equipment—In this 12-page illustrated brochure are described such items as autoclaves, agitator assemblies, quick opening doors, extractors, cookers, resin plants, package pilot plants, and package heating and cooling units. Entitled "Process Equipment" (No. 2403), the bulletin contains charts which give dimensions of electro-vapor heating systems, and standard sizes and pressures of autoclaves. *Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 30, Pa.*

Toy yearbook—Among the toys selected for inclusion in this year's toy yearbook are an infant rattle that lights up electrically; a mother dog with a zipper pouch containing three puppies; a switchboard that buzzes; a parade of walking dolls; and craft sets that permit children to cover glasses with raffia, print newspapers on a real printing press, and create distinctive jewelry with beads and pearls. In a new section devoted to space toys are items ranging from a rocket ship to a flying saucer gun. Available for 10¢ (stamps) from *Toy Guidance Council, Inc., 1124 Broadway, New York 10, N. Y.*

Humidification—Information on the subject of humidification as it applies to particular industries is contained in this bulletin entitled "A Few Facts About Humidification." Also discussed in the bulletin are such topics as "What Is Meant By Relative Humidity;" "What Problems Are Associated With Low Humidities;" and "How to Overcome Low Humidity." In addition, the bulletin describes various models of industrial humidifiers, humidity indicating instruments, and home and office humidifiers. *Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica, N. Y.*

Periodic charts—Information essential to basic study and laboratory work in chemistry is contained in this two-color chart of the arrangement of the elements. The chart includes atomic numbers; symbols; atomic weights; and the orbital electron distributions for the noble gas

Tupper Seal, air and liquid tight flexible covers fit, and are included in the sets of all Tupperware Canisters.

The Tupperware 50 oz. Canister is "standard equipped" with the Tupper Seal, air and liquid-tight flexible Pour All cover.

The Tupper Seal, air and liquid-tight flexible Pour All cover is used on every Tupperware 20 oz. Canister.

The Tupper Seal, air and liquid-tight, Pour All cover as a cover for 46 oz. cans; Tupperware Sauce Dishes and other containers of metal, glass or pottery. Foods easily dispensed without removing entire cover.

The Tupperware Wonder Bowls are usually fitted with Tupper Seal, air and liquid-tight covers.

Argentine Patent 74,095 dated Dec. 14th, 1949 on invention covered by U. S. Patent 2,487,400 November 8, 1949. Canada Patent 463,387 Feb. 28th, 1950. Union of So. Africa Pat. 8,592 Sept. 21st, 1949. Belgium Pat. 491,293 Oct. 15th, 1949. Switzerland Patent 48,970 Sept. 23rd, 1949. Italy Patent 456,937 September 19th, 1949. Germany Patent 829,248 September 25th, 1949. Great Britain Patent 662,219 September 27th, 1949. Argentina Patent 96,970 September 30th, 1949. Brazil Patent 39,676 December 29th, 1951. Mexico Patent 51,615 January 3rd, 1952. Other U. S. and Foreign Patents Pending.

TUPPER / Seals

air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.

TUPPER /

FORMAL NOTICE! 9th November, 1949

EXCLUSIVE!

U. S. Patent #2,487,400

The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.

The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.

Tupper Seals for Tupperware shown in this advertisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.

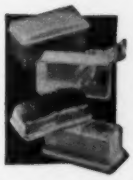
Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.

Tupper Corporation will protect, according to law, the exclusive rights above granted

TUPPER CORPORATION

There's a Tupper Seal, air and liquid-tight flexible cover for Tupperware 2, 5, 8 and 12½ oz. Tumblers too, and these Tupper Seal, covers fit many other containers of metal, glass and crockery.

The Tupper Seal, air and liquid-tight flexible Pour Top cover, specially designed as a dispensing cover for specified diameters of containers holding foods such as syrups, salad dressings, catsup.



The cover of the Tupperware Bread Server which serves as a bread tray also is designed to give similar results as Tupper Seal, air and liquid-tight Flexible covers. Keeps contents fresh as no other such container.

When equipped with Tupper Seal, air and liquid-tight, flexible covers, Tupperware Cereal Bowls serve many another purpose.

The Tupper Seal, air and liquid-tight flexible cover made for Tupperware 8 oz. Tumblers also fits and is sold with all Tupperware Funnels as a base when funnels are used as storage containers.

TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

Factories, Laboratories and Sales Offices: Farnumsville, Mass., Orlando, Fla., L'Epiphanie, P.Q. Showrooms: 225 Fifth Ave., N. Y. C.

ADDRESS ALL COMMUNICATIONS TO: Department M-1

COPYRIGHT TUPPER CORPORATION 1949

elements. Also contained in the chart are an electromotive force table of the elements with the respective ions, and a four-place logarithm table. *Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.*

Vinyl stabilization—A stabilizer, known as "Staycin 1" and designed to inhibit plasticizer exudation, is announced in this 4-page color brochure. Included are properties, description, and costs of the product. *Baker Castor Oil Co., 120 Broadway, New York 5, N. Y.*

Latices—Data on the latex series, including plasticizing and pigmenting methods, are described in a 16-page booklet. Physical properties of the latex films are given in the booklet, which is called Production Information Bulletin No. 58. *Product Development Dept., Plastics Div., Monsanto Chemical Co., Springfield 2, Mass.*

Machine tools—A new type pedestal tool grinder as well as tools and attachments for lathes, drill presses, and shapers are described in this 88-page General Catalog 5205. Included are illustrations and specifications of all the company's machine tools and accessories. *South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind.*

Thermocouples—Descriptions, specifications, and suggested applications of bare wire thermocouple glands are given in this 4-page illustrated folder. The sealing principle is shown by diagram. *Conax Corp., 4515 Main St., Buffalo 21, N. Y.*

Color styling service—Market trends in merchandise color preferences are discussed in these Color Styling Reports. The four reports are entitled: "Color Trends;" "Toy Colors;" "Housewares Colors;" and "Wall Tile Colors." *Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.*

Industrial chemicals—Specifications, properties, and typical uses of 54 industrial chemicals are described in this 33-page illustrated catalog. An addition to the 1953 issue is the inclusion of those chemicals produced in whole or in part by the company's new chemical manufacturing division in Longview, Texas. Part I deals with aliphatic chemicals, Part II with aromatic chemicals, Part III with cellulose products, and Part IV with inorganic chemicals. A 2-page chart lists the chemical products, their uses, and the industries they serve. *Tennessee Eastman Co., Div. of Eastman Kodak Co., Kingsport, Tenn.*

Diethyl oxalate—Complete specifications and properties of diethyl oxalate are given in this single catalogue sheet, which also includes formulas for the product's most common applications, notably in the manufacture of diethyl phenyl malonate, a raw material for the synthesis of phenobarbital. *Commercial Solvents Corp., 260 Madison Ave., New York 16, N. Y.*

Custom extrusions—Entitled "Custom Extrusions in Thermoplastics," this illustrated 4-page folder gives comprehensive information about the characteristics of thermoplastics. Also discussed are the forms and shapes of extruded plastics. Included are a general summary of applications of thermoplastics in industry, and a properties chart. *Anchor Plastics Co., 36-36 36 St., Long Island City, N. Y.*

ASTM index—This 50-year index provides a detailed author and subject guide to all the ASTM technical papers and reports dealing with materials, particularly as to their properties and testing, appearing in ASTM publications during the period from 1898 through 1950. The 216-page publication is intended for use by materials technologists, researchers, and librarians. Available for $6.00 per copy from *ASTM Headquarters, 1916 Race Street, Philadelphia 3, Pa.*

Compression molding—Illustrated leaflets describe three types of compression and transfer molding equipment. Platens (steam or electric) and their sizes are presented in a 1-page sheet. A 4-page leaflet discusses an automatic process timer, which includes a cure cycle control adjustable from 0 to 10 minutes. A preforming machine is described in another 4-page leaflet. This unit is designed to deal not only with normal grades of phenol formaldehyde and urea formaldehyde powders, but also with melamines, which require higher pressure. Details of construction, lubrication, feed, and safety are given. *T. H. & J. Daniels, Ltd., Lightpill Iron Works, Stroud, Glos, England.*

Collective bargaining—Written for management, negotiators, labor relations people, and conciliators, this new manual describes the inside working techniques of present-day collective bargaining and conciliation practice. Included in this 270-page manual are many case studies. Available for $4.50 from *National Foremen's Institute, Inc., New London, Conn.*

High impact styrene—Advantages, applications, and properties of the company's high impact styrene sheets are described in this illustrated folder. Included with the folder are two samples of colored sheets. Information is given as to sizes, thickness range, weight, color selection, and formability. *Sandee Mfg. Co., 5050 Foster Ave., Chicago 30, Ill.*

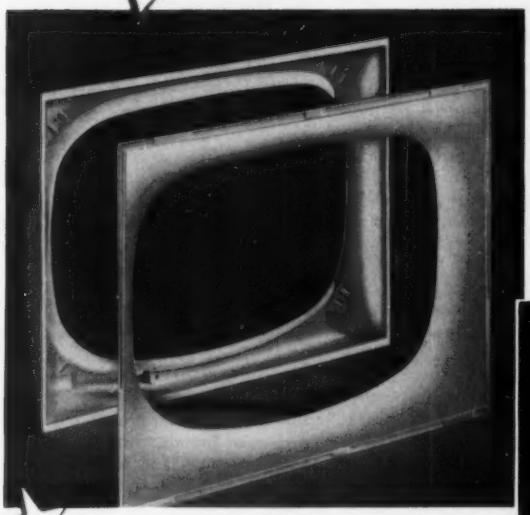
Furfural—A report on the use of furfural as a material for the manufacture of plastics, this 14-page booklet covers both the early history of the chemical and much of the experimental work of recent years. Charts and tables serve to illustrate such topics as organic amine additives; 2-furaldehyde (furfural) derivatives as additives; furan derivatives; lignin additives; and condensing agents other than hydrochloric acid. Iowa State College Bulletin Engineering Report No. 13, available from *Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa.*

Packaging—Applications to packaging of several of the company's products, including Vinylite, polyethylene, styrene, and phenolic plastics and resins, are fully described and illustrated in a new 12-page edition of this reference pamphlet. Properties, advantages, applications, and fabricating methods are set forth under six headings: coatings; molded and blown plastics; sheet materials; film and sheeting; packing materials; and adhesives. *Bakelite Co., Div. of Union Carbide and Carbon Corp., 260 Madison Ave., New York 16, N. Y.*

Fluorocarbon film—Complete details of the company's fluorocarbon film product (Trithene) are given in this

a new star in television...

Koppers Polystyrene!



VERSATILITY and quality of performance, plus economy in production, explain the rising popularity of Koppers Polystyrene with the designers and manufacturers of television sets. Its performance in the applications shown here has been highly satisfactory and forecasts a larger and more important role in the production of television sets in the future.

There's a type of Koppers Polystyrene for practically every product need. A letter of inquiry will quickly bring a Koppers representative with details about the Koppers Polystyrene that best fits your particular needs.

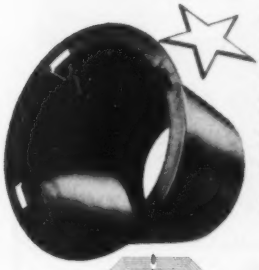
Sylvania's HaloLight, a frame of light around the picture tube, incorporates Koppers "Evenglo" Polystyrene with which opacity, color and diffusion of light can be more accurately controlled than with any other material commonly used. Koppers formulation of "Evenglo" assures exact similarity of light characteristics in each piece, as well as the required stability and dielectric strength.

The mask used in Sylvania's HaloLight frame is Koppers Modified Polystyrene MC 301. Koppers Modified Polystyrenes combine high shock resistance and greater toughness with physical strength, smooth finish and the other desirable characteristics of regular polystyrene.

Molder: Amos Molded Plastics, Edinburg, Indiana.

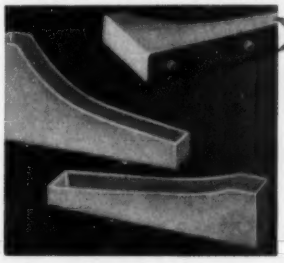
This front lens, made for Majestic Radio and Television, Division of the Wilcox-Gay Corp., is molded of Koppers crystal Polystyrene 31. Its combination of properties permits its use in a variety of large moldings. Crystal clarity, light weight and dimensional stability make it an economical material.

Molder: Proton Plastics, Division of Prophylactic Brush Co., Florence, Mass.



This rear protective cap for the reverse end of the picture tube is made of Koppers Polystyrene MC 301, one of the Modified Polystyrenes with high resistance to shock and impact. It can be molded easily, quickly and economically to the close tolerances required in the finished product.

Molder: Sylvania Electric Products Inc., Warren, Pa.



These supports for a picture tube were molded for Zenith Radio Corporation. Ability to withstand the heat and weight of the tube were necessary requirements of the supports. Koppers Polystyrene satisfied these essentials at a low unit cost.

Molder: Service Plastics, Inc., Chicago, Ill.

Koppers Plastics Make Many Products Better and Many Better Products Possible

KOPPERS ®

Koppers Plastics

KOPPERS COMPANY, INC., Chemical Division, Dept. MP-13, PITTSBURGH 19, PA.

SALES OFFICES: NEW YORK • BOSTON • PHILADELPHIA • CHICAGO • DETROIT • LOS ANGELES

illustrated 14-page booklet. Chemically, the material is a film made of a polymer of trifluorochloroethylene, and, in its natural state, is colorless, clear, and transparent. Properties, fabrication, and chemical resistance are fully discussed. A small mailing sample is available for examination. *The Visking Corp., P. O. Box 1410, Terre Haute, Ind.*

Reference file—Information on the company's molding activities is contained in this 6-page brochure. Among the topics covered are key personnel, tooling facilities, and engineering services. The brochure also contains a list of products and their descriptions, and concludes with a customer reference list. *Minnesota Plastics Corp., 366 Wacouta St., St. Paul 1, Minn.*

Scientific development—Summarizing scientific and engineering investigations conducted by the National Bureau of Standards during the fiscal year 1951, this 105-page illustrated booklet (NBS Miscellaneous Publication 204) also contains accounts of activities now going on, as well as detailed descriptions of important scientific developments. There is a general account of activity in the 15 scientific and technical divisions at NBS, together with specific examples of projects. Available for 50¢ from *Government Printing Office, Washington 25, D. C.*

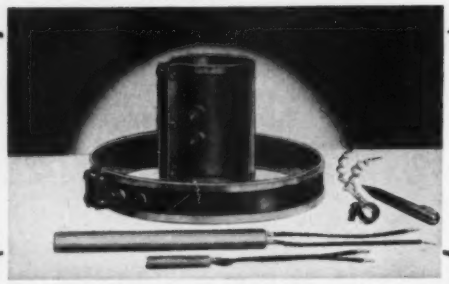
Laboratory items—Various tools, gages, bottles, funnels, and other items utilized in laboratories are described and illustrated in this 4-page booklet. Among the products are bottles, funnels, and tubing of polyethylene; an electrothermal heating tape; and a diamond-point pencil for marking glass, ceramic, or other hard surfaces. *E. Machlett & Son, 220 E. 23 St., New York 10, N. Y.*

Toledo glass tangle—Entitled "An Answer to Toledo's Glassplexity," this folder has been published to clarify the confusion caused by the similarity of names of the four big glass companies in Toledo. The text explains the origins and differences of Libbey-Owens-Ford and its Fiber-Glass Div.; Owens-Corning Fiberglas Corp.; Owens-Illinois and its Libbey Glass Div.; and Glass Fibers, Inc. A brief historical sketch supplements colored charts which give full details of the origin, size, divisions, products, and officers of all four glass manufacturers. The "untangler article," as it has been called, has been reprinted by the four companies involved; copies may be obtained from any one of the companies.

Polyethylene glycol esters—The origin and physical and chemical properties of a series of compounds known as the polyethylene glycol fatty acid esters, or, as they are sometimes called, the polyoxyethylene esters, are discussed in full detail in this 29-page report. Solubility, emulsifying properties, and wetting are fully explained with the aid of tables. *Kessler Chemical Co., Inc., State Rd. & Cottman Ave., Philadelphia 35, Pa.*

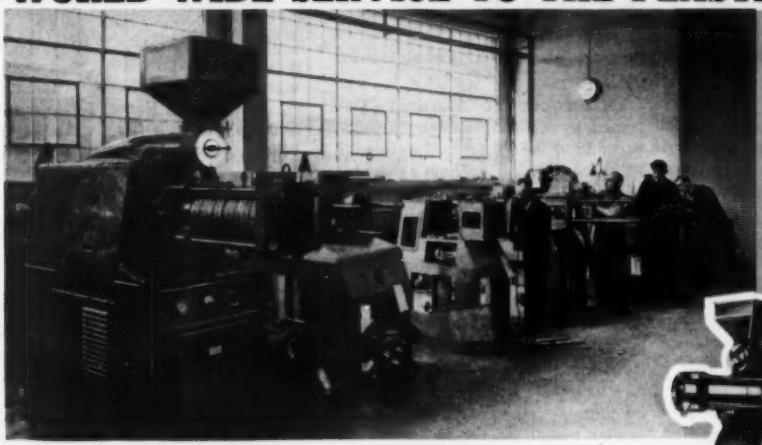
Heliogen colors—Properties and uses of the company's line of heliogen colors are described in this 16-page brochure, which gives full information on the powder brands, paste and presscake brands, water-dispersible powder brands, and water-dispersible paste brands. *General Dyestuff Corp., 435 Hudson St., New York 14, N. Y.*

Plastics Molding
for America's
LEADING MANUFACTURERS
ALL MATERIALS ALL METHODS
Northern
40 YEARS OF
PLASTIC MOLDING EXPERIENCE
INDUSTRIAL CHEMICAL CO.
11 ELKINS ST., SO. BOSTON, MASS., SOuth 8-4240
BRANCH OFFICES
441 Lexington Ave. New York, N. Y. Tel. VAnderbilt 6-1684
211 Powers Bldg. Rochester 4, N. Y. Tel. BAker 8701
P.O. Box 5604 Phila. 29, Pa. Tel. Victor 4-8679

HEAT FOR PLASTIC PROCESSING
You specify the size

ELECTRIC HEATERS of ALL TYPES
• For Machine Parts
• For Liquids
• For Air
ALSO SPECIAL REQUIREMENTS
INDUSTRIAL HEATER CO., INC.
1921-1953
245 Canal St. New York 13, N. Y.

Windsor

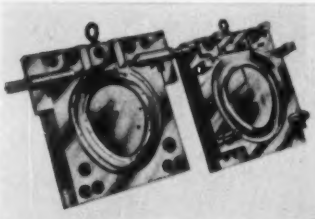
WORLD WIDE SERVICE TO THE PLASTIC INDUSTRY



R.C. SERIES Multi-Screw Compounder Extruders

R·C·65
(Manufactured under L.M.P. Patents)

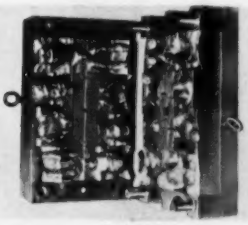
- A corner of the new Windsor extension plant showing the R.C. series compounder extruders in production.
- Plastic industries throughout the country are discovering new economies through using the improved R.C. 65. Full details and specification will be mailed to you on request.
- Windsors' also welcome inquiries for molds, dies and crossheads, our mold department employ some of the best craftsmen in Britain.



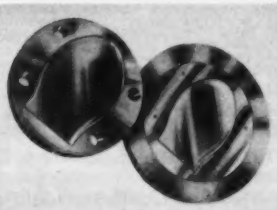
Toilet seat mold

PRECISION
MOLDS
FOR
INJECTION PRESSES
EXTRUSION DIES
CROSSHEADS
AND EQUIPMENT

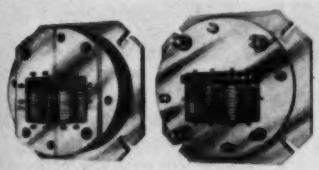
Operator polishing mold



Doll mold



Toilet lid mold



Lettering rack mold

Exclusive U.S.A. Representative
F. J. STOKES MACHINE COMPANY
PHILADELPHIA 20, PENNSYLVANIA

Canadian Representative
WILMOD COMPANY Plastics Division
81 QUEEN STREET WEST, TORONTO

Inquiries for Injection Presses and Molds direct to:
R·H·WINDSOR LTD. Sales Divisions ROYAL LONDON HOUSE, 16 FINSBURY SQUARE, LONDON, ENGLAND
Phone: MONarch 8722
Head Office and Works: LEATHERHEAD ROAD SOUTH CHESSINGTON, SURREY, ENGLAND
Phone: Epsom 2634/5 Grams & Cables: WINPLAS, SURBITON, SURREY

NEW MACHINERY AND EQUIPMENT

BELT SANDER—Designed for deburring, grinding, and polishing operations on plastics, metals, rubber, and glass, a new belt sanding machine is announced by Benchmaster Mfg. Co., Gardena, Calif. The 4 in. diameter belt wheels are mounted on wide, heavy-duty, double-row double-sealed ball bearings which are both waterproof and dustproof. At average working loads, bearing life is estimated in excess of 10,000 hours. A unique trackage adjustment insures positive wheel alignment. The top wheel supporting arm is rocker-mounted as well as pivoted

for belt takeup. A spring load insures correct belt tension when using the back-up plate. No auxiliary belt trackage devices are required. The pivoted back-up unit retains its parallelism with the belt at any angular setting of the table. The sander is driven with a "v" belt by a ¼ hp. 1750 r.p.m. motor. It is designed to operate at any speed up to 8000 sfm, permitting use on high speed steels. Any standard belt width from ¼ to 1 in. by 44 in. length is accommodated.

THERMOCOUPLE ASSEMBLY—Designed to precisely detect temperatures in masses as small as plastic molds of two oz., this Type J thermocouple assembly can be used for measuring bearing temperatures and for many other processes. The unit was developed by Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.

Purpose of the assembly is to overcome production difficulties in the plastic industry where the mass to be controlled is too small to support earlier models of thermocouple assemblies.

PORTABLE TEMPERATURE CONTROLLER—The production of a portable precision temperature controller, designed for laboratory technicians, research and testing companies and firms which require intermittent use of control instruments at different locations throughout the plant has been announced by Taco West Corp., 525 N. Noble St., Chicago 22, Ill. Precision control is accomplished by merely plugging the instrument into a wall outlet and plugging the unit to be controlled into the instrument. Then, by inserting the instrument thermocouple into an oven, bath, thermocouple well, etc., the true temperature will be indicated by the upper pointer and may be controlled at any desired point by setting the lower pointer to the correct scale position by means of the external setting knob.

CUTTING MACHINE—Designed to salvage rejects of plastics film and sheeting, a portable cutting machine has been developed by H. Maimin Co., Inc., 575 Eighth Ave., New York 18, N. Y. The machine cuts from the roll any plastic film or sheeting that has been rejected for color, improper finish, etc., so that it may be re-processed.

Equipped with a roller plate adjustable for depth of cut, the machine is manipulated by two handles and may also be suspended from overhead. Other features include trigger controls at the handles and blade guards.

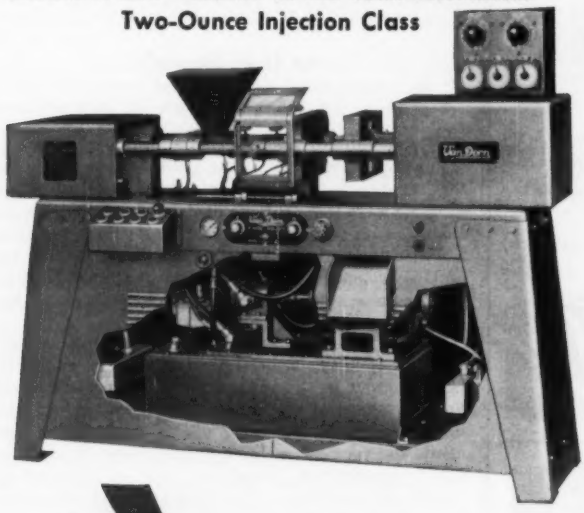
POLYETHYLENE MOLDER—An injection molding machine which gives single shot moldings of up to 160 oz. of polyethylene and double shot moldings of up to 300 oz. has been designed by G. H. Ferry, a director of Folkard-Ferry Ltd, Archetype Works, Rectory Lane, Edgware, Middlesex, England. Versatile in performance, the machine can make large single shot moldings, and can be used just as efficiently, with

greater speed, on smaller moldings. The work of preparing the mold and of removing finished moldings is done by hand, and the power which drives the machine is controlled by hand switches.

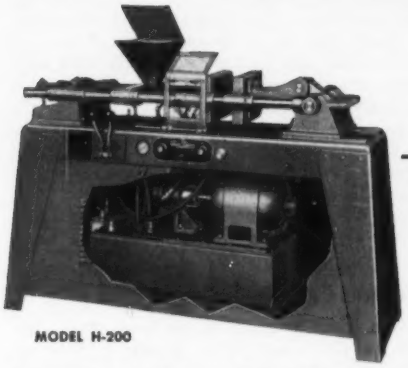
A number of different molds can be used in a working day. If, for instance, 160-oz. moldings are being shot and time must be allowed for them to cool and for the cores to be extracted, other moldings of different size and weight may be shot in the meantime. The machine, with its steel channel framework, is 8½ ft. high, covers a floor area of 12 sq. ft., and weighs about 1000 pounds.

Produce Plastics Profitably With This
VAN DORN Equipment

Model H-200—Leader in the Semi-Automatic Two-Ounce Injection Class



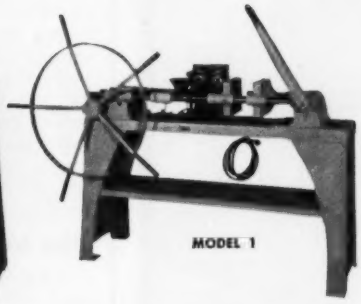
This ultra-modern press molds practically all thermoplastics including nylon. It completes up to 6 operating cycles per minute. Push button controls are safe, simple and convenient. Compact and rugged, the unit is quiet and economical in operation. Sliding gate with interlocking safety devices starts the cycle. Solenoid valves close the molds. Injection and dwell are controlled by first of three timers on the rear panel. Center timer regulates recharging of heater. The third timer controls the length of the mold close cycle; when time runs out, molds automatically open and parts are ejected. Operator opens safety gate, removes product and then closes gate to begin the next cycle . . . Variable voltage transformers in conjunction with thermostatic units control the temperatures on the two heating zones accurately.



MODEL H-200

Power Operated, Lever Controlled Presses

2-oz. or 1-oz. capacity. These low-cost units operate 8 hours for under a dollar and use inexpensive molds. Can easily be set up in twenty minutes by one man.



MODEL 1

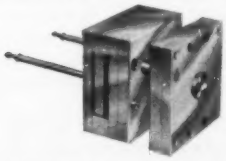
Manually Operated Press

1-oz. capacity. This press is ideal for smaller jobs, experimental work and technical training.

MODEL G-100

Plastic Grinder

Grinds up rejects, waste, etc., for re-use. Ruggedly made, designed for easy cleaning.



Mold Bases

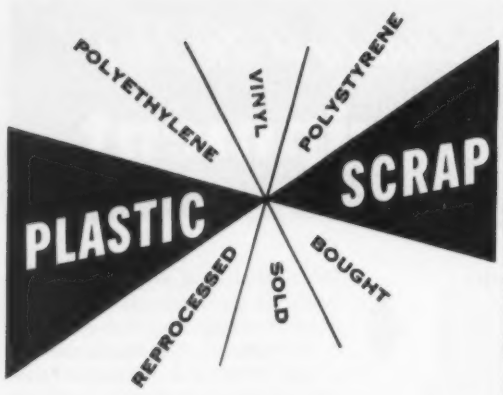
Available from stock for all Van Dorn presses.

Write for Bulletins on this Equipment

THE Van Dorn IRON WORKS CO.

2687 EAST 79th STREET • CLEVELAND 4, OHIO

Cable Address: "VANDORN" Cleveland



We offer a steady market for your scrap and surplus plastic materials.

Tanney-Costello, Inc.
DEALERS • CONVERTORS • GRADERS
868 E. Tallmadge Ave., Akron, Ohio
Phone: Blackstone 4148 • Cable: "COSTAN" AKRON

M&M PLASTIC PELLETERS

M & M Plastic Pelleters will produce clean cut plastic pellets that need no screening when cutting the product from extruder or compounding mill. A variable speed drive permits the Pelleter to be synchronized with the extruder or mill output. The M & M straight knife Plastic Pelleter will cut extruded plastic rods into pellets of uniform size and shape. The M & M notched knife pelleter will produce pellets of uniform size in a hexagonal shape from plastic ribbons up to 10" wide.
Write us about your needs today.

70

MITTS & MERRILL
1016 South Water Street • SAGINAW, MICHIGAN

Flame Retardant

Recently developed method, involving the use of chlorinated paraffin - wax, is now available to users of thermoplastics who are seeking greater flame retardance

by G. F. Rugar*

THE growth of thermoplastics has been one of the outstanding phenomena of the plastics industry during the last decade. Their properties have been utilized in so many ways that products made of thermoplastics are almost legion. Their use in some applications, however, has been hampered because they are flammable. The recent development of a method for rendering thermoplastics flame retardant should, therefore, open up important new fields of application.

Polyethylene, polystyrene, natural and synthetic rubber, and cellulose acetate butyrate can be effectively flame retarded by the new process. The effect is achieved through the use of a mixture of additives combined with the thermoplastic on usual plastic processing equipment. The principal additive is Chlorowax 70, a chlorinated paraffin-wax containing 70% of chlorine by weight. Its usefulness in flameproofing work was established in World War II. In the early part of the war chlorinated rubber and chlorinated paraffin-wax containing 40% chlorine were used as ingredients of a composition for flameproofing textiles required by the military forces. When the production of chlorinated rubber was suspended because of the unavailability of rubber, the development and use of Chlorowax 70 permitted the inclusion of other film-forming resins in these compositions. Thus, chlorinated paraffin-wax containing 70% chlorine became an essential part of textile flameproofing compounds.

Other Additives Used

It has been found necessary to use some other additives with the Chlorowax 70 for producing flame retardant thermoplastics. Antimony trioxide, commonly known in the trade as antimony oxide, is the second essential ingredient in the treating composition. The other processing materials such as plasticizers, pigments, and extenders normally used with specific plastics are maintained in their usual amounts. In addition, it is common practice to incorporate a material which can act to prevent degradation of the composition when exposed to elevated temperatures during processing or use.

Polyethylene lends itself to flame retardant treatment very well. Flame retardant polyethylene has good dielectric strength, low power factor, and is non-tracking.

*Ass't manager, Technical Service Div., Diamond Alkali Co.

These excellent electrical properties are retained even after immersion in water for periods as long as a year. Even at elevated temperatures under these conditions, the flame retardance remains constant.

The mechanical properties of polyethylene are not altered greatly by the addition of Chlorowax 70 and the other flame retardant materials. Polyethylene which has been rendered flame retardant retains its toughness, flexibility, and good tensile strength, and may be extruded on wire at high speeds. It can also be injection molded.

Already, considerable quantities of flame retardant polyethylene have been used for cable coating. It is being specified by the military for this purpose. In fact, the military requirements have been so heavy that there has been practically none available for civilian use. Recent installation of increased production capacity for both Chlorowax 70 and polyethylene, however, will provide flame retardant polyethylene for high frequency electrical uses such as neon sign cable and television lead-in wire.

A second thermoplastic that can be made flame retardant is polystyrene. The excellent compatibility of Chlorowax 70 with polystyrene results in a uniform product with good moldability and mechanical properties which differ from untreated polystyrene principally in that the impact strength and heat distortion temperature are lowered somewhat. Flame retardant polystyrene is particularly well-suited for such uses as toys and wall tile for kitchens where flame retardance is a desirable safety factor. Again, the development of applications for flame retardant polystyrene was delayed because of the scarcity of the plastic and Chlorowax 70, created by the military requirements.

Cellulose acetate butyrate can be made self extinguishing by the same process. The physical properties of the plastic are not materially changed except that the softening point is lowered a few degrees. This may be an advantage in some instances because during the molding process the plastic flows more readily and fills out intricate parts more completely. Besides its application for toys and specialties, flame retardant cellulose acetate butyrate is finding use in molded parts requiring high physical strength such as vacuum cleaner motor housings.

An important practical aspect of this new process is the fact that the usual method of compounding using common equipment for plastics is employed. The flame retardant additives are milled into the plastics on a heated two-roll rubber mill or in a Banbury. Stabilizers and lubricants are added to the mix as required. It has been stated that chlorinated paraffin may undergo some decomposition at elevated temperatures. For this reason care should be exercised in mixing and molding plastics to keep the temperature below 425° F. with suitable stabilizers. Chlorowax 70 will stand this condition.

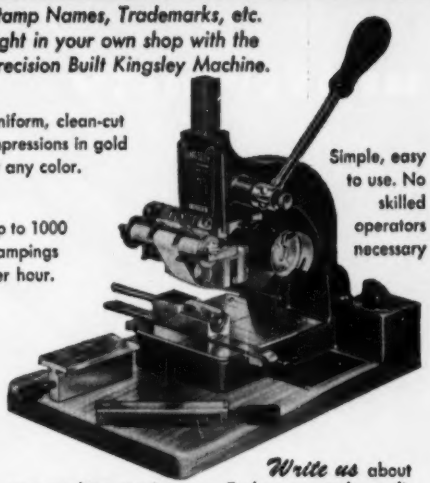
The process under discussion was developed by the Diamond Alkali Company, Cleveland, Ohio. The Technical Service Division is available to assist in the utilization of these ideas by the plastics industry.

PLASTIC MARKING

Stamp Names, Trademarks, etc. right in your own shop with the Precision Built Kingsley Machine.

Uniform, clean-cut impressions in gold or any color.

Up to 1000 stampings per hour.



Simple, easy to use. No skilled operators necessary

Write us about your marking requirements. Enclose a sample or dimensions of part to be stamped. We'll reply air mail with complete details on how a Kingsley Machine can be applied to *your specific need.*

Kingsley STAMPING MACHINE CO.
HOLLYWOOD 28, CALIFORNIA

WORLD
Plastex

For EXTRUDED plastics

- Quality Extrusions
- Delivered on Time
- All Rigid and Flexible Thermoplastics

WORLD PLASTEX

WORLD PLASTEX
1685 Boone Ave., Bronx 60, N. Y.
Kilpatrick 2-2220

Peas in a pod appear to be identical in colour and size—but close inspection and measurement would reveal considerable differences. That they are apparently uniform is a mere chance.

P. 4½" PLASTIC EXTRUDER

Driven by a 30/10 H.P. variable speed commutator motor, giving 3 to 1 speed range so that by means of the vee rope drive any desired range of speeds between 8 and 75 R.P.M. may be obtained.

All electric heating with separately controlled barrel and die head heater zones has been a unique feature of Shaw machines for over 12 years. The output is approximately 200/250 lb. per hour.

Leaflet No. P. 321 gives full details.

The uniformity of the plastic extrusions produced with Shaw machinery is no chance—it is by design. Shaw Plastic Extruders ensure complete uniformity in the continuous production of tubing, miscellaneous sections, insulating and sheathing of cables, film, colour mixing and the delivery of milled and molten material for sheeting and casting purposes.

SHAW

Industry's headquarters for the best in plastic and rubber machinery

FRANCIS SHAW AND COMPANY LIMITED CORBETT ST. MANCHESTER 11 ENGLAND

Acids in a Box

THE future of polyethylene in industrial packaging holds promise of duplicating—and even exceeding—the outstanding success of the material in consumer-type packaging.

Typical of the trend in this direction is a box-shaped 15-gal. polyethylene shipping container developed by Tennessee Products and Chemical Corp., New York, N.Y. Light in weight, chemically inert, and unbreakable, the container appears ideal for the shipment of hard-to-handle corrosive chemicals.

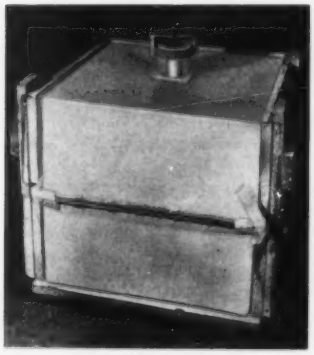
The complete carboy consists of a polyethylene liner—16⅛ by 16⅛ in. by 15⅞ in. deep—enclosed in a sturdy wooden box and provided with a detachable polyethylene pouring spout.

The liner has a uniform wall thickness of ⅛ inch. It is molded in two half sections under 11,000 p.s.i. by A. L. Hyde, Glenlock, N.J. The sections, which are claimed to be the largest molded polyethylene parts yet made, are then joined into a unit by heat-sealing their flanged ends. As reinforcement, and in order to effect a permanent mechanical seam, steel edging that completely rims the four sides of the container is also laid on.

An acid-proof collar, formed of Micarta laminate, screws down over the neck of the liner and holds both the neck and the top of the liner firmly in position against the wooden case.

The Karbox shipping container is assembled by Chemical Containers Co., Inc., Jersey City, N.J.

Carboy for handling acids has polyethylene liner and detachable spout



TURN ON THE RED LIGHT

THE MAN WANTS RED PLASTIC!

IT'S ALMOST AS SIMPLE AS THAT—AND WITH

UNICOLOR

YOU SAVE MONEY TOO—

The simple truth is that UNICOLOR saves as much as 5½c per pound. It reduces inventory losses and costs. Also eliminates production delays while increasing equipment capacity.

UNICOLOR requires no skilled mixing hands, nor special mixing equipment. Coloring and extrusion is simultaneous without worry as to color uniformity and product regularity.

UNICOLOR is perfectly matched to meet your customer's most exacting requirements. UNICOLOR also comes in a wide variety of NEMA approved scientifically matched colors.

Write us about your problems and send for additional information on how to cut costs and increase the sales appeal of your plastic products.

WESTCHESTER PLASTICS

WESTCHESTER PLASTICS, INC.

326 Waverly Avenue, Mamaroneck, New York

Custom Compounders of Thermoplastic Materials

Consult Waterbury for MOLDED PLASTICS

Creative Service in Product Development

Research. Design. Engineering.
Compression, Transfer, High Speed, Injection and Low Pressure Molding.
Over a Century of Fine Tool and Mold Work.
Finishing. Assembling.

PRODUCERS OF PLASTIC CONTAINERS FOR MANY WORLD FAMED PRODUCTS

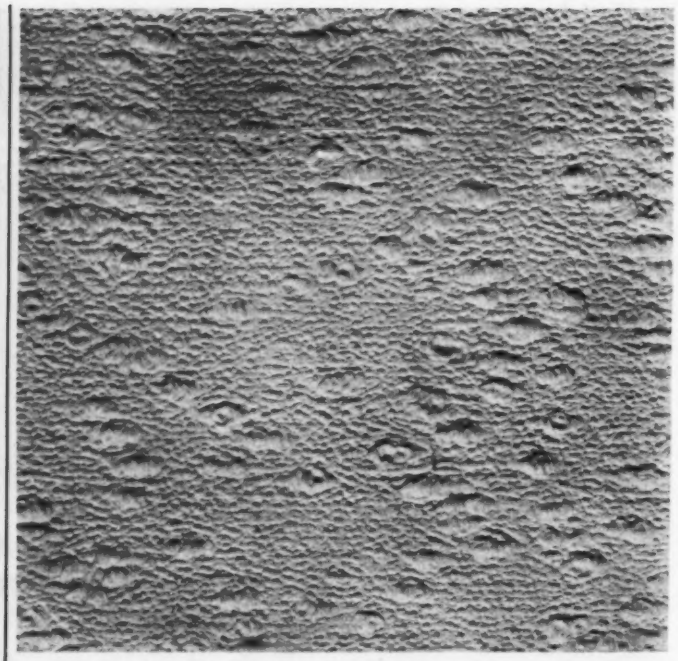
SALES OFFICES

NEW YORK 17, N.Y.
17 East 42nd St.
BOSTON 11, MASS.
99 Chauncy St.
CHICAGO 6, ILL.
223 W. Jackson Blvd.
CLEVELAND 13, OHIO
632 Terminal Tower
ROCHESTER 5, N.Y.
L. W. Sage, Inc.
33 University Ave.
DETROIT 7, MICH.
Wm. Robert Wilson & Associates
6460 Kercheval Ave.

Our technical staff will gladly confer with you.

Write for Waterbury Plastics Catalog "M"

WATERBURY COMPANIES, INC.
Waterbury, Conn.



Photograph, approximately full size, of section of new patterned vinyl film shows how faithfully the plastic material reproduces the texture of cloth on which it is "molded"

Cloth-Patterned Vinyl Film

NUMEROUS advantages are claimed for a recently announced vinyl film, called Weavtex, which is being produced by an unusual process to obtain faithful reproductions of fabric textures on both sides of the film. The process, introduced by Clopay Corp., Cincinnati, Ohio, involves melting the plastic film in contact with the surface of a specially treated fabric, and then stripping the film from the cloth. It is claimed that virtually any type of fabric can be used as the "mold" for producing the texture. The only limitation is that the cloth must be able to withstand the elevated temperature at which the film melts.

The process is a continuous one. Basically, it involves placing the vinyl film (from 1½ to 7 mils thick) against the cloth surface, raising the temperature to the melting point, cooling with a cold air blast, and stripping.

So faithful is the reproduction of the texture of the cloth that the resulting material must be touched in order to determine whether it is plastic or the original cloth.

By this process, which does not weaken the film at any point as often as is the case in embossing, the plastic film gains new memory. It faithfully retains the texture and, when stretched, will return to its new surface form. It is stated by the developers that the process eliminates all traces of gloss and sheen and that the treated film will not curl at the edges. In addition, the film is reported to retain its original strength; there are no "thin spots" in the pattern to weaken the material. Weavtex is soft and drapable, completely crush- and wrinkle-proof, and is easily cleaned. The textured film can be printed by conventional methods to obtain desired effects.

Present markets for Weavtex are in window shades and draperies, with possibilities in aprons, wearing apparel, and other fields where thin vinyl films are indicated. The new and restyled line of Clopay draperies will consist of 15 new patterns.

Gering is Geared TO SERVE THE ENTIRE PLASTICS INDUSTRY

a complete **PLANT** *for a complete* **SERVICE**

WE MANUFACTURE Virgin Thermoplastic injection and extrusion molding compounds, standard and special formulations. Polystyrene, Polyethylene, Acetate, Acrylics, Ethyl Cellulose, Vinyls.

- **WE BUY THERMOPLASTIC SCRAP** — all types and forms: Polystyrene, Vinyls, Nylon, Ethyl Cellulose, Polyethylene, Acetate, Butyrate, Acrylics.
- **WE CUSTOM COMPOUND** your materials, and offer these special services: Sorting, De-contaminating, Color-Matching, Pelletizing.
- **WE EXTRUDE** any flexible or rigid formulation which you plan, for any special-shaped Belting, Binding, Edging, Rods, Tubes, Film, Strips . . . in Polystyrene, Cellulose Acetate, Polyethylene, Vinyl, Butyrate, Ethyl Cellulose, Acrylics.

DRYCOL —offered as Gering's perfected dry coloring medium for in-plant coloring of ALL PLASTICS. No special skill or equipment needed. Standard, Special and Metallic colors available or to order.

Our service is world-wide . . . attained over the years thru eternal self-discipline for Quality, Perfection, Delivery. Consult our Technical Service Department.

Our 30 years expert know-how and large facilities: Your guarantee of complete satisfaction.

GERING *Products* INC. KENILWORTH, N. J.

PHENOPREG

EXPERIENCE AND EQUIPMENT

If you are looking for an impregnator to handle the most critical jobs with precise control, think first of Fabricon. We offer many years of experience with all types of thermosetting laminating materials and fillers. Our modern production machinery and control equipment are skillfully operated by trained personnel. As a result of our experience, we are able to offer a wide range of standard impregnated materials for all applications, as well as complete facilities for the development of special products.

FABRICON PRODUCTS, INC. *Plastics Div.*
Main Office 1721 Pleasant Ave. • River Rouge 18, Mich. • Vinewood 1-8200
Manufacturing Plants: River Rouge, Los Angeles • Sales Offices: N.Y., Chicago
Canadian Representative: Plastic Supply Company, Montreal, Toronto

FABRICON

PRIME CONTRACTORS SEE "ACCURATE" FOR MILITARY COMPONENTS

The manufacture of molded plastics for devices for military requirements is one of our specialties . . . thousands of military parts are in present production.

Considerate and experienced handling of your plastic molding problems is available thru ACCURATE SERVICE where you will find ample, modern facilities to meet your every plastic molding requirement . . . at MAXIMUM efficiency and economy.

INJECTION · COMPRESSION
MOLD IT BETTER FASTER
PLUNGER
TRANSFER

SEND your specifications NOW! We invite your toughest problems. . . . . NO OBLIGATION

SPECIALISTS IN SMALL RUNS USING HAND MOLDS

ACCURATE MOLDING CORPORATION 35-20 48th AVENUE LONG ISLAND CITY 1, N.Y.

Only by touch can illusion of depth in new transparencies be dispelled

In Three Dimensions

INGENIOUS retention of natural balances of highlights and shadows in lithographic printing on vinyl sheet has brought new realism to illuminated displays. Developed by Videx Corp., New York, N. Y., the transparencies are printed in full color on regular lithographic presses.

The vinyl sheet is printed on both sides to give the proper amount of contrast and depth to produce the three-dimensional illusion. The front picture responds to variations in ambient lighting.

By employing this method, the illusion is achieved without lenticular screen or optical devices, thereby eliminating distortion or shift. The effect remains perfect at all distances and from all angles.

The Videx process can be handled at normal lithographic speeds. Excellent definition of color rendition is obtained in the transparency photograph. Highlights and shadows are introduced to give the display a remarkable depth of field.

The texture, color, and body of the lithographic transparency provides the visual impact to the observer of seeming to view the actual subject. The transparency, which is set into a simple frame and lighted by a bulb from behind, can easily be changed as the occasion demands.

The basic Videx transparency, although shot with a special camera, is also used for standard platemaking. Conventional color shots can be used after special processing.

Here's the key to **FASTER PRODUCTION** and **LESS MAINTENANCE**

Thermex
PLASTIC PREHEATING APPARATUS

High frequency power is applied automatically when the operator closes the sliding drawer. After a pre-set interval, a timer shuts off the power. The unit is mounted on rubber-tired casters for easy portability from job to job.

WITH THIS 3-kilowatt THERMEX* Plastic Preheating Unit you can heat up to 2¼ pounds of general purpose material from 80 to 250°F in one minute—permitting much faster mold closing and curing. And the unit is engineered to keep production rolling with a minimum of maintenance downtime:

. . . longer-than-average tube life is assured by a special filament transformer which maintains constant voltage, and a patented air flow switch which maintains correct tube temperature.

. . . rugged, enclosed construction protects relays from dust and flash. Fumes are exhausted from the rear of the unit.

. . . shielding maintenance problems are largely eliminated by exclusive sliding-door preform compartment.

Find out how you can benefit from THERMEX Plastic Preheating Apparatus . . . a Thermex field engineer will gladly study your operations and make recommendations. Write The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

*THERMEX—Trade Mark Reg. U. S. Pat. Off.

SPECIFICATIONS

Power Data—Power Requirements: 230-volt or 460-volt, 60-cycle, 3-phase. Power Input: 6.3 KVA at 90% power factor. Power Output: 3 KW.

Heating Capacity—Electrode area of 10" by 12" will accommodate preforms up to 3¾" thick. (Special electrodes to provide larger heating area available.)

Controls—Controls on front of cabinet include electrode height adjusting knob, plate ammeter, grid meter, grid adjustment knob, timer, and main circuit breaker.

Construction—Heavy gauge aluminum cabinet contains built-in material-heating compartment with electrode and preform handling tray.

Dimensions and Weight—21" wide, 24" deep, 53¾" high. Weight: 925 lbs. gross, 800 lbs. net.

the **GIRDLER** Corporation
Thermex Division

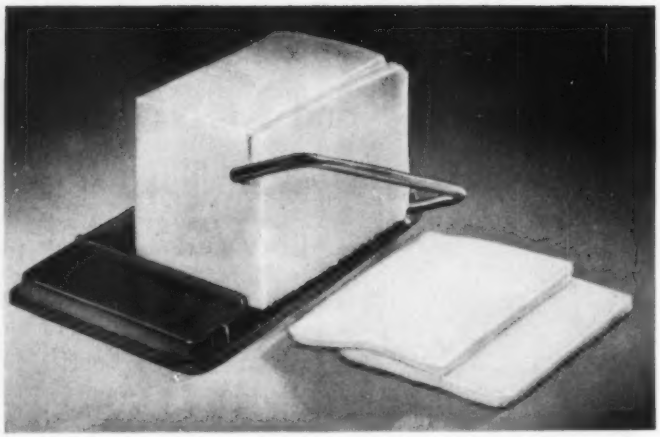
a calender can't duplicate!

Manufacturers who want a shiny high polish or a rich matte finish on their vinyl sheeting can eliminate the necessity of an extra polishing run on an embosser by adding a Liberty Polishing Unit to their calender. The Liberty Polishing Unit works its magic equally well on virgin and reprocessed materials.

This hydraulically powered unit is made in widths from 39" to 84", and is synchronized in with the calender. It actually increases production . . . because it may be used to *decrease* the gauge of the material as it comes from the calender and polish it in a single operation. An operator is not needed.

Liberty Machine Co. also makes high chrome cylinders, embossing machines, printing presses, inspection units and other equipment for plastic sheet processing. Write for details on these units. LIBERTY MACHINE CO., INC., 275 Fourth Avenue, Paterson 4, New Jersey.

LIBERTY MACHINE CO., INC.



Ridges molded in the slicer base serve to hold the food to be sliced firmly in place during the slicing operation, permitting the cutting wire to completely sever even slices

Food Slicer

A perfect slice each time is assured by the No. 707 Federal cheese slicer manufactured by Federal Tool Corp., Chicago, Ill.

The base or cutting block is injection molded of Dow Styron in a four cavity mold. The frame for the stainless steel cutting wire is of nickel plated cold rolled steel.

Styrene was chosen because it is attractive, stable, and inexpensive. The base or cutting block has a molded-in X-frame which both reinforces and lightens the piece. The use of the X-frame greatly strengthens the base to withstand operational pressure and eliminates the need for heavy wall section.

The frame is assembled to the cutting block by inserting the steel arm through the base and swedging the end of the frame. This makes disassembly impossible. The stainless steel cutting wire is pulled taut and is also swedged permanently to the frame.

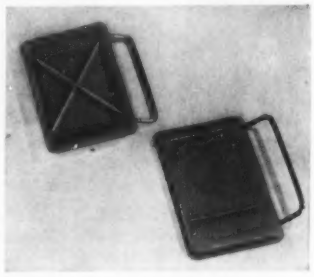
The slicing wire will cut through the hardest cheese, cold meat and sausages of irregular shape or size evenly and without the slice breaking off before the cutting wire reaches the bottom of the stroke. Softer products such as butter or hard boiled eggs are not crushed or mangled by the thin, strong, rust-free steel cutting wire.

Top surface of the cutting block has two ridges or guides which serve to hold the material to be sliced in the proper cutting position, thus preventing the food from sliding across the surface and producing uneven slices.

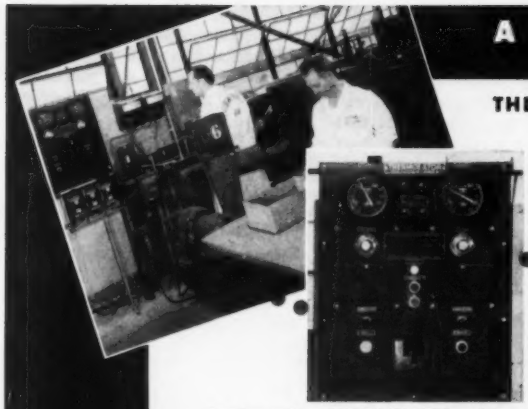
The small and compact food slicer easily lends itself to storage in a corner of a kitchen cabinet or utility drawer.

The cutting block is 3⅝ by 5⅞ in. long and the cutting wire is 4½ in. long. The complete unit is lightweight, sanitary, and can be cleaned with a minimum of trouble.

X-frame construction of the base serves to strengthen and lighten the slicer



The Good Housekeeping Seal of Approval has been awarded to this food slicer.



ANNOUNCING

THE COMPLETELY AUTOMATIC

THERMOLATOR*

*REG. U. S. PAT. OFF.

MOLD TEMPERATURE CONTROL UNIT WITH PANEL MOUNTED CONTROLS

• AT-A-GLANCE VISIBILITY OF CONTROLS
Big Thermometers and pilot lights permit instant check on operating conditions by Supervisor.

• PUSH BUTTON START
Set dial for desired temperature in each half of mold, then press button to start. That's all! THERMOLATOR'S quick heat-up gets mold to operating temperature FAST!

• AUTOMATIC CONTROL OF MOLD TEMPERATURE
THERMOLATOR maintains temperature within ½° F. of dial setting, switching from adding heat to draining heat automatically according to need. Water level in tanks also is maintained automatically.

• OUT-OF-THE-WAY INSTALLATION OF UNIT
Controls mounted on panel; Relay Box location where convenient; THERMOLATOR unit itself at either end or behind press, out of traffic pattern.

Panel mounting of THERMOLATOR and Press controls in Federal Tool Corp. plant in Chicago. "Helps spread supervision out thinner" and solves a management problem of providing supervisory personnel.

Portable THERMOLATORS are recommended for use where self-contained units are needed.

FOR INFORMATION WRITE TO . . .

Industrial MFG. CORP.

31 E. GEORGIA ST. • INDIANAPOLIS 4, IND.

REPRESENTATIVES

F. W. Jennison, P. O. Box 57, Merrick, N. Y. • Pacific Scientific Co., 1430 Grande Vista Ave., Los Angeles 23, Calif. • IN CANADA: Richardson Agencies, Ltd., 454 King St., West, Toronto 1 • FOR EUROPE: Jacques Bojet & Co., 15 Park Row, New York 7, N. Y.

Plans for Fluorocarbons

FLUOROCARBONS are an important and comparatively new phase of the chemical and plastics industry. Although the following paragraphs treat largely with fluorocarbon chemicals, they hint also of the plastics implications that are involved. The details are of particular interest to MODERN PLASTICS readers because the electrochemical method described is a different approach to fluorination and could well have an effect on future cost of fluorocarbon products.

It was just about a year ago that Minnesota Mining & Mfg. Co. announced full-scale operation of the world's first unit for making fluorochemicals electrochemically in semi-commercial quantities.

A quarter million dollar unit, located near Hastings, Minn., provides production facilities for manufacture, in ton lots and larger, of special purpose fluorochemical materials including fluorinated acids and perfluoro liquids and gases. The 3M plant has made it possible for other companies to buy and evaluate the utility of the new fluorochemical compounds in their own applications on pilot plant or semi-works scale.

Principal users of experimental quantities to date have been major chemical, pharmaceutical, and electrical companies, and agencies of the Federal government, such as the Atomic Energy Commission. They have used the fluorochemicals primarily as a new group of chemical intermediates in the manufacture of other products. Among the products that may eventually be affected are resins and coatings, dyes, polymers, solvents, refrigerants, fire-extinguishing compounds, surface-treating agents, dielectrics, hydraulic fluids and coolants, and lubricants.

As a wetting agent—stable to concentrated nitric acid and other powerful oxidizing agents—the higher perfluoro acids and their salts are unsurpassed. They provide the greatest reduction in surface tension yet discovered.

Trifluoroacetic acid is used to make thenoyl trifluoroacetone, which can be used to separate zirconium from the hafnium in which it is found. This metal is needed for use in atomic reactors and power plants—probably because it resists high temperatures and is relatively stable against bombardment by neutrons, the triggers of the atom bomb.

Acetylene—reacted with a number of perfluoro acids—has resulted in a number of new transparent thermoplastic resins.

Fluorocarbons with high boiling points and exceptionally high vapor densities, many times that of steam, could be used in turbines, reducing their size and increasing their thermodynamic efficiency. These fluorocarbon vapors are non-corrosive and are unaffected by temperatures as high as 900° F.

Fluorocarbon lubricants will probably be the ultimate in lubricant materials because of their remarkable stability to heat. Ordinary lubricants are readily oxidized to yield acidic products which do

damage to machinery. Fluorocarbon lubricants, on the other hand, are known to be stable even at elevated temperatures. The design of a fluorocarbon molecule to meet all the requirements of a flat viscosity curve, good lubricity, etc., as well as thermal stability, is the subject of much laboratory study and evaluation at this time.

Two types of compounds are currently being produced and sold by the 3M company—reactive compounds, such as completely fluorinated acids and their derivatives, and unreactive compounds including inert perfluoro liquids and gases. The liquids include both perfluoro tertiary amines and perfluoro ethers.

The chief value of the new fluorocarbons lies in their stability. The completely fluorinated acids, for example, can be used to hook fluorocarbon groups into organic compounds, increasing their thermal and chemical stability and fire resistance, and lowering their surface tension and refractive index.

The inert liquids are significant because of their unusual thermal and chemical stability, dielectric properties, non-corrosiveness, and high densities. They are being evaluated by a number of electrical manufacturing companies for use as cooling agents, insulation media, etc.

Two of the first compounds that were produced in the new 3M plant were trifluoroacetic acid and heptafluorobutyric acid. Prices of these compounds are considerably lower now than they were when production was in the pilot plant stage.

Trifluoroacetic acid, for example, now sells for $5 a pound. Other compounds range from $5 up to $15 a lb., but the goal is to increase production until prices drop down to $2 or even $1 a pound. This is expected to allow more and more companies to experiment with the compounds and eventually use them in production of new and improved products.

Among the reactive compounds currently in production are trifluoroacetic, heptafluorobutyric, perfluorosuccinic, perfluoroadipic, and other completely fluorinated acids and their derivatives.

Some of the inert compounds available for study are perfluoro gases and liquids, such as perfluorobutane, perfluorotripropyl amine, and perfluorodiethyl ether.

Production at 3M is based on a process developed and patented by Dr. J. H. Simons of the University of Florida. It consists of passing a current through a mixture of the organic starting material and liquid anhydrous hydrogen fluoride in an electrolytic cell. Hydrogen comes off at the cathode. The fluorochemical discharges at the anode as a gas or liquid, and is purified by distillation for use in products with specific physical and chemical properties.

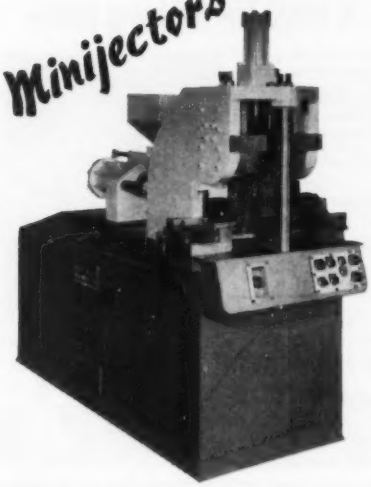
The big advantage of the electrolytic cell method is that it doesn't involve free fluorine itself. Instead, liquid anhydrous hydrogen fluoride is used, thereby eliminating the difficult and dangerous methods previously involved in working with free fluorine. Furthermore, ordinary materials can be used in construction of equipment since anhydrous HF is non-corrosive.

Dr. Simons first worked with fluorochemicals in the early 1920's, but it was not until just before World War II that he was able to produce fluorocarbons by the elec-

Sinko
CHOICE OF THE LEADERS
We are today molding countless thousands of precision parts and products for such leading manufacturers as the Admiral Corporation. Their most rigid requirements are being met in our producing for them such items as the Butter Storage Unit (pictured above), Vegetable Crispers, Sterile Lamp Guards, Push-Button Assemblies, Knobs, etc. . . . all for the 1952 Admiral Refrigerator.
In addition to molding all thermoplastics, including Nylon, Sinko has complete facilities for design and engineering, mold-making, metal-plastic fabricating, 2 and 3 color plastic spraying, and hot stamping.
WE OPERATE OUR OWN VACUUM DISTILLATION DEPARTMENT!
Sinko MANUFACTURING & TOOL CO.
2137 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

MOSLO

Minijectors



High Speed PRODUCTION
Low Cost OPERATION

Want volume injection molding with low die expense? Then investigate these small high-speed Moslo Minijectors—which in hundreds of cases are out-performing larger machines in turning out small molded pieces or parts. Every Minijector is built for lasting service and will provide economical, efficient, automatic operation.

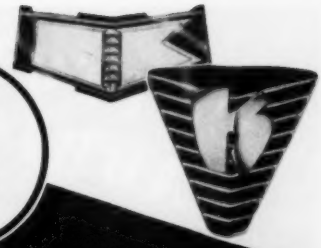
MOSLO DUPLIMATIC MINIJECTOR—especially for insert molding of cord-plugs, switch parts, etc. A two-sided self-positioning lower mold section allows operator to remove finished molded part from the mold section and refill with new inserts while the other mold section is in cycle. Automatic hydraulic operation provides for complete operator safety. Mold casting area 40 square inches. Injection pressure 20,000 p.s.i. Injection capacity to 4 oz.

OTHER MODELS AVAILABLE

¾ Oz. Hand and Hydraulic
¾ Oz. HC-75
1 Oz. Model 71 Horizontal Hydraulic
2½ Oz. Standard and High Speed

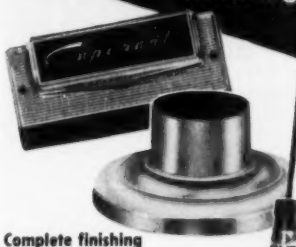
For Full Information Write

MOSLO MACHINERY COMPANY
2443 PROSPECT AVENUE · CLEVELAND 15, OHIO



JB
Finishes the Job!

Acclaimed coast to coast by manufacturers who demand outstanding finishing of plastics!



ADMIRAL
KAISER FRAZER
RCA
DEEPFREEZE
PHILCO
ZENITH
CAPEHART
SENTINEL
HOTPOINT

Complete finishing and assembly
Modern spraying equipment
Silk screening
Hot stamping

JB has America's most modern plant devoted exclusively to the art of applying decorative finishes to plastics. JB has the latest type of equipment for production plating by the evaporation method. This is supplemented by modern dipping, baking and spraying equipment. High vacuum metalizing is only one of JB's specialties, and permits them to offer any decorative work you require, giving complete versatility of use at low cost.

New! *Low cost decorative plating in gold, silver, copper finishes on metal stampings or die castings.*

Molders! *You can now bid on every plastic job, including those that require decorative finishing.*

Facilities are available to everyone.

Write or phone today for complete information on finishing and assembly.

J. B. PRODUCTS CORPORATION
Finishers for the Plastic Industry
1745-55 N. Ashland Ave., Chicago • BRunswick 8-4213

COTTON FABRICS

FOR

COATING

AND

LAMINATING

★

J.H. LANE & CO., Inc.

250 W. 57th St. • New York, N. Y.

Important addition

To SUMMIT-ROBERTS TOOL CO.

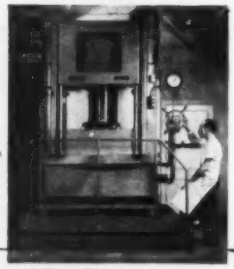
... a 2500 ton hobbing press

For over 20 years we have hobbed cavities in only the highest quality hobbing steel. Now, by industry demand we offer our services to cold hobb your cavities for

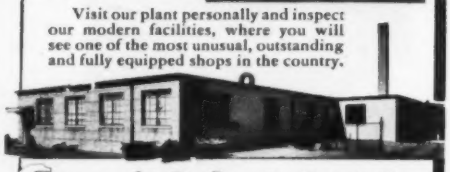
MOLDS for Plastics

Die casting Dies

We can make the hobbs or use yours.



Visit our plant personally and inspect our modern facilities, where you will see one of the most unusual, outstanding and fully equipped shops in the country.



Summit-Roberts Tool Co.

830 NEW YORK AVE. • TOLEDO, OHIO

trochemical method. As is widely known, certain fluorocarbon liquids and resins were developed by the Manhattan Project for use in connection with the processing of uranium fluoride for the atom bomb. Dr. Simons had worked for 3M on other projects, and in 1944 the company began sponsoring his work on fluorocarbons.

A wide variety of organic compounds—even those not directly soluble in liquid HF—can be used as raw materials and, with slight changes in the process, a wide variety of fluorine-containing compounds can be produced. Many of these, incidentally, have never been produced by any other method.

Plastics have received a major share of attention in the fluorochemical field. The Air Force has for some time sponsored a large research program at 3M to develop synthetic rubber with high fluorine content. Some of the results of this work were presented recently before the American Chemical Society at Atlantic City.

Although no fluorochemical plastics have been released by 3M to the trade, some development work has been carried on toward that end.

Highly fluorinated molecules produced by the 3M-Simons electrolytic cell form the starting point for making plastics. For example, vinyl type plastics result from reaction of perfluoro acids with acetylene. These have received some study in the 3M laboratories, but as yet there has been no sales promotion of them.

Pyrolysis of the sodium salt of a fluorocarbon acid yields a perfluoro-olefin. For example, C_2F_4 can be made from C_2F_7COONa. The olefins are capable of polymerization and copolymerization with various other monomers. Various chemical companies are studying reactions of this type with a view to designing new plastics of high fluorine content.

Perfluoro dibasic acids can be copolymerized with glycols to give new condensation polymers.

Rubbery polymers of the perfluoro alkyl acrylate type were described at the Atlantic City meeting of the ACS. These materials contain the fluorine atoms in the alcohol part of the molecule. Such alcohols are made by chemical reduction of the corresponding perfluoro acids.

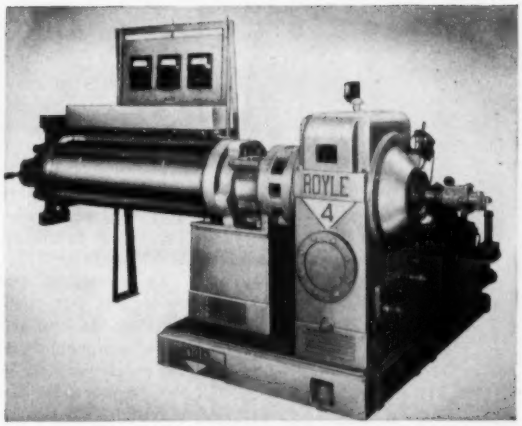
Another type of plastic which is quite new is based on perfluoro aldehydes. These materials are still under study in 3M laboratories.

It was reported by Professor Dunlap of the University of Maine at the Atlantic City ACS meeting that anhydrous trifluoroacetic acid has the remarkable property of dissolving cellulose without serious degradation of the molecular structure, and that the cellulose can be regenerated in various useful forms. This process deserves further study, since the acid can be recovered and used again.

The whole subject of fluorochemical monomers and polymers is receiving a very intensive screening in 3M laboratories with the object of selecting one or two outstanding products for manufacture and sale. At the same time, many other companies are working with 3M fluorochemicals as intermediates for making still other end products.

Although the Hastings semiworks unit is only a year old, its production facilities are already too small to serve the expanding interests.

ROYLE
SPIROD* EXTRUDERS



Built by America's oldest builders of extruding machines Royle Spirod extruders are the result of more than seventy years experience in the design of extruding machines. Time tested and proven features are built into Royle Spirod extruders to assure maximum productivity at minimum operating cost. These features include: Heavy steel members without flanges . . . Spirally installed rod type heating elements to provide faster, steadier, more evenly distributed heat . . . Complete insulation of cylinder and head to reduce heat loss with substantial power savings . . . Separate heating zones controlled by proportioning instruments.

CHECK THESE FEATURES that assure profitable and trouble-free production of such items as plastic insulated wire, flexible and rigid pipe, plastic sheeting, plastic clothes line, to mention a few of the products that are produced daily with Royle Spirod extruders.

*Patent Applied for

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England	Home Office	Akron, Ohio	Los Angeles, Cal.
James Day (Machinery) Ltd.	V. M. Hovey J. W. VanRiper	J. C. Clinefelter	H. M. Royal, Inc.
REgent 2430	SHerwood 2-8262	JEfferson 3264	LOgan 3261

PATERSON 3, NEW JERSEY

UNIFORMAT*
NEW FERRO FIBER GLASS MATS FOR REINFORCING PLASTIC PRODUCTS

Fill out the coupon below for your samples of this new, radically "different" Fiber Glass Reinforcing Mat. Users tell us "it's the *most uniform, best colored, most usable* mat material they have ever seen."

UNIFORMAT is now available in 50" wide rolls up to 150' in continuous length, and with either high solubility or general-purpose binder, depending on the molding process you prefer. Standard weights are 1½, 2 and 3 ounces per square foot.

UNIFORMAT is produced on a unique machine of our own design which assures uniform weight and texture and provides equal reinforcing strength in all directions.

High-Quality Chopped Strand and Roving Also Available.

*T. M. REG. APPLIED FOR

FERRO

Ferro Corporation • Fiber Glass Division
200 Woodycrest Ave. • Nashville, Tenn.

Please send me a sample of UNIFORMAT with spec. sheets and prices.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

major molding methods

Our many customers find it a distinct comfort to know that Plastic Molding Corp. molds by *all five major molding methods.*

To them this means we always consider their molding assignments in terms of *what is best,* not in terms of *what equipment we have* . . . because we have every type of press equipment for molding plastics . . . the *one* molder in New England who offers you *all five major molding methods.*

PLASTIC MOLDING CORPORATION
SANDY HOOK, CONNECTICUT

Molders of Plastics for over a Quarter Century

German Plastics Exhibition

PLASTICS producers, processors, and machinery manufacturers may expect increasing competition from the German plastics industry in the immediate future. This is the concensus of observers from all over the world who attended the Dusseldorf Exhibition held October 11-19, 1952.

The exhibition itself was a great success. It was open to the public and, like the 1946 exhibition in New York, was mobbed. More than 150,000 people jammed the aisles to see the "Wunder der Kunststoffe" displayed by 245 exhibitors. The German public expressed their intense desire to be convinced of the future of plastics. They obviously wanted to see what these materials had to offer in roles other than wartime ersatz. And they went away satisfied.

The plastics products shown at the exhibition were not out of the ordinary, by industry standards. They encompassed—in both thermoplastics and thermosets—the consumer and industrial items well known in every country today. But, over-all, the impression of the Dusseldorf Exhibition was one of vast progress—progress over a period of five years after a four-year period of paralysis.

During the post-war period, German technicians have concentrated largely on exploring the possibilities of the newer materials—polyethylenes, fluorocarbons, polyesters, silicones, and acrylonitriles. Polyurethanes, about which much has been heard in post-war years, are still in the experimental stage. Perhaps uses can be found for these resins which will relegate their high cost to a secondary place; perhaps their high cost will be materially reduced as production progresses.

In the well established materials —styrenes, vinyls, acetates, and thermosets—high quality and low prices were prominent. Polyethylene is just starting to make a place for itself. High-impact styrene with excellent elasticity, and which will withstand boiling water, is being widely used in Germany. Foamed styrene is reported in pilot-plant production.

Rigid vinyl was an outstanding feature of the exhibition. A number of exhibitors showed examples of this material in chemical plant equipment and apparatus of varied nature, all beautifully fabricated. Vinyl film and sheeting was well represented in displays of curtains, upholstery materials, and personal accessories such as handbags. Observers state that exhibits of embossed and printed vinyl were the best ever shown in Europe. Demand for vinyls—both rigid and plasticized—has been high, and has resulted in expanded production of better materials. PVC was displayed extensively in both colors and clear.

In the plastics machinery field, injection and extrusion machines held the spotlight at Dusseldorf. Over 20 manufacturers displayed injection machines, most of them of pre-war design. Prices were low. Both single- and twin-screw extruders were shown.

The long-standing tradition of German standards of machinery production was best exemplified, for the plastics industry, in the exhibits of mixing units, rotary cutters, Banburies, etc. Vacuum metallizing units were on display and manufacturers offered not only equipment but access to technical know-how as well.

As one observer sums up the position of German plastics machinery manufacturers today, they are partly behind, partly on the international standard, and ahead in single items. Prices are low—20 to 40% in some cases under American and British f.o.b. prices. In addition, the manufacturers offer excellent service and outstanding technical booklets and descriptive material.

Another observer at Dusseldorf estimates that 10,000 industry representatives from all over the world attended the exhibition. As a result, many foreign firms have entered into business agreements with German manufacturers. A number of international arrangements have been set up for mutual exchange of information and licenses, and more are pending.

All in all, as a result of the Dusseldorf Exhibition, it is obvious that the German plastics industry will soon be a factor of great importance to the international picture.

FASTEST

8-ounce injection molding machine ever built!

"through these doors pass the most profitable plastic products in the world!"

Never before a plastics molding machine like the new Fellows 5C-8! Cycling speed has been upped to 420 per hour—dry run! Plasticizing capacity increased to 100 lbs. per hour! This means your production jumps from 10 to 25% on every job—and you know what this can mean in profits! But that's not all! The new 5C-8 can also handle the over-flow jobs from your smaller machines with virtually equal speed. Investigate the new Fellows 5C-8 today! It will prove a shrewd move.

Fellows

injection molding equipment

THE FELLOWS GEAR SHAPER COMPANY, Plastics Machine Division, Head Office and Export Department, Springfield, Vermont
Branch Offices: 323 Fisher Bldg., Detroit 2, Michigan • 5835 West North Avenue, Chicago 39, Illinois • 2206 Empire State Bldg., New York 1, N.Y.

Phenolics

(*Continued from pp. 57-9*)

68.1 million pounds. Around 25 or 30 million lb. of thermosetting plastics are used today for closures.

In all the excitement about plastic pipe it seems strange that phenolic pipe has been neglected. It was experimented with after World War II and apparently laid aside because of production and marketing problems. It is now claimed that production has been perfected, but the marketing problem still survives. It is rather an odd circumstance that phenolic producers use rather large quantities of phenolic pipe themselves but its use otherwise is comparatively minor.

The possibility of a fibrous glass-filled phenolic is also looking better as a fairly sizable item in the future. It can be transfer molded, has more strength value than anything ever before developed in plastics, and can compete with brass in price. An experimental telephone hand set has been molded that is so hard and tough it could be used to drive nails.

One producer thinks that the way to sell phenolics is to constantly hammer upon the theme that pound for pound it is less costly than metal. As mining, smelting, and transportation costs become higher, phenolic can move in, especially since improvements in both resin and filler continue to make it a better product.

Better Buy

The same producer points out for example that phenolic at 20½ cents a lb. is a better buy than zinc at 12 cents since the higher specific gravity of zinc places its volume cost at 3.16 times more than phenolic. Toothpaste tube caps, for example, are now nearly all phenolic. They replaced zinc back about 1930 on a price basis and have maintained superiority ever since.

If a phenolic unit is measured at one, aluminum would sell at 1.91 times more and copper at 8.15 times more under present day prices. Something of the market involved is shown by 1950 sales of 531 million lb. of zinc die castings; 144 million lb. of aluminum die castings, and 13 million lb. of copper base castings. Phenolics couldn't possibly get all these markets, but they would be suitable for a substantial portion.

Phenolic adhesive resins have shown by far the greatest ratio of volume growth in the phenolic industry since the war. They grew from around 30 million lb. in 1950 to an estimated 40 million lb. in 1952. They show a 150% percentage growth since 1946, compared to around 40% and 20% growths for molding and miscellaneous resins respectively. Nearly all of the adhesive resin is used for exterior type plywood, although several million pounds a year is used in mixtures with blood glue for a small portion of the interior type plywood production.

It is estimated that about 3 billion sq. feet of softwood plywood will be produced in 1952, a slight increase over 1951. Between 25 and 30% of this volume will be exterior plywood and will use phenolic resin—interior softwood plywood is most generally glued with soya. It is believed that a sizable percentage of interior type plywood may eventually be made with an extended phenolic and thus increase resin use in that grade. The hardwood plywood

Lind
PLASTIC PRODUCTS
Creative Custom Molding

This unusual spoon was designed especially for Dairy Queen Products and the "Cone with the Curl on Top" is a faithful reproduction of their famous logo carefully molded to their exact specifications.

Watch for our continued series of advertisements showing creative molding of products which we have designed and produced for nationally known brands, logos and trade marks.

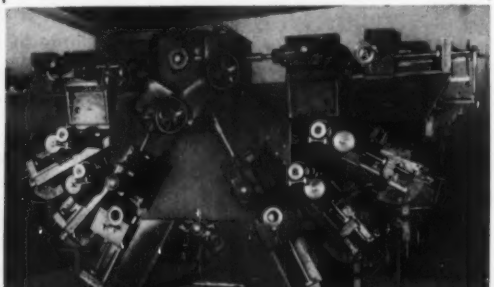
When your ideas demand plastic products of ANY TYPE of injection molding where precision is your hallmark and low cost your goal

Lind
PLASTIC PRODUCTS

REMEMBER
LIND PLASTIC PRODUCTS
Creative Custom Molding
6900 N. Central Park Avenue
Chicago 45, Illinois

UNIQUE NEW LEMBO
prints four colors by rotogravure; up to eight colors by surface printing

- for vinyl and other plastic films
- readily changed from gravure to surface printing
- new adjustment prevents wrinkling of sieve cloth
- optional handwheel or motor register control
- available to print up to 12 colors and to 80" wide



Specifications and prices on request

LEMBO MACHINE WORKS, INC.
248 EAST 17TH ST. PATERSON 4, N. J.
Manufacturers of Printing Presses and Cylinders

industry is also increasing its use of phenolic resins with the installation of hot plate pressing equipment.

There is some question, however, as to whether or not phenolic resins used as plywood glue will ever exceed 45 or 50 million pounds per year. The entire production of both grades of plywood must eventually reach a point where it can no longer expand because of a shortage of peeler logs. There is also a question in some people's minds as to whether or not the civilian market will absorb the great volume of plywood now going into military usage when the Emergency Program is over, but it is interesting to note that per capita consumption in the U.S. is only half that of Canada.

About 60% of all softwood plywood today is used for industrial purposes such as concrete forms, truck bodies, freight cars, heavy crating, and such. It is the aim of the industry to increase use in shelter and modernization programs so they can take up the amount now going for military purposes when such purchases cease.

The amount of plywood now used in home construction is growing rapidly due to the increased popularity of plywood sheathing. New surface coatings of both phenolic impregnated paper and alkyd paints will also help that situation. Railway freight cars use only a fraction of their potential. Truck bodies of plywood look promising since they are much lighter than metal and help truckers increase their pay load. Hangars for both military and civilian airfields are under study. Exterior plywood for farm buildings would be a natural if plywood prices hold to their present level.

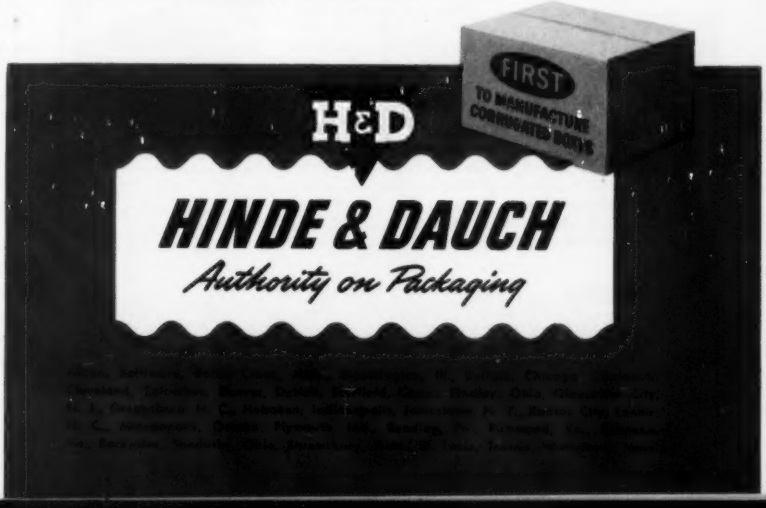
The constantly fluctuating price structure in the plywood industry has raised havoc with profits. The over-expansion in facilities has resulted in a capacity of over 4 billion sq. ft. a year while consumption is only 3 billion. The big producer blames the little producer for lack of profit and the little fellow blames the big guy for this uncertain price situation. How the industry has continued to prosper under this bitter price war is an amazing testimony to its hardiness.

Phenolic resin sales to the plywood industry during 1952 were remarkably stable all year, fluctuating from about 3 to 4 million lb. a

How to "wrap-up" a 1200-lb. package!

Heavy, hard-to-handle rolls of plastic sheeting speed their way safely and economically to automotive safety glass manufacturers in strong, shock-absorbing, freight-saving H & D corrugated Pallet Paks. Previously, drums were used with a resulting high handling and shipping expense. Now—this simplified packaging method, developed by the H & D Package Laboratory, protects nine rolls in shipment. Over-all packing, handling, and storage costs are materially reduced.

Use H & D material handling methods to *your advantage*. You will realize freight savings, easier packing, simpler handling, better product protection, more economy at every step. For 13-volume "Little Packaging Library," write Hinde & Dauch, 5317-A Decatur Street, Sandusky, Ohio.



METASAP STEARATES help DUREZ produce improved Phenolic Molding Compounds

Distributor Caps molded from Durez phenolic molding compounds containing Metasap zinc stearate.

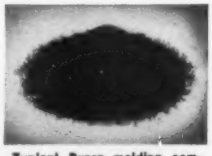
Says Durez Plastics & Chemicals, Inc.: "We mix Metasap zinc stearate into our phenolic molding compounds during processing, because we find it to be a very satisfactory mold release agent. Addition of this lubricant definitely permits finished molded parts to be ejected more easily from the mold."

AND EASY EJECTION FROM THE MOLD MEANS:

★ *Increased Output*
★ *Less Rejects*
★ *Improved Finished Products*
★ *Longer Mold Life*

So profit by specifying molding compounds that contain a Metasap Stearate. For whether it be compression or transfer molding of thermosetting materials, or injection-molding of thermoplastics, you'll find Metasap stearate lubrication an outstanding aid to more profitable operation!

Send us your specifications. We'll gladly supply detailed information about Metasap Calcium and Zinc Stearates—today's foremost lubricants for plastics molding. And our Technical Service Division will be pleased to work closely with you and make recommendations based on your specific needs.



Typical Durez molding compound, offering an outstanding combination of physical properties. Widely used for producing thousands of industrial parts and products.

METASAP CHEMICAL COMPANY, Harrison, N. J.
Chicago • Boston • Cedartown, Ga. • Richmond, Calif.

month, and that too was an amazing feat since the price situation in resin is even worse than in finished plywood. One producer says raw material costs of phenol and formaldehyde used in a lb. of adhesive resin are 23.45 cents but that he gets back only 22½ cents when the material is sold as a 40% solution. How other producers can make money on such a transaction is a mystery which hasn't been unraveled.

Other Wood-Resin Uses

Close kin to the adhesive resin business are the waste wood, hard board, and laminated wood developments, all of which are relatively small now in resin consumption but ought to be rolling along in big volume about 1954.

Laminated wood—big pieces made out of little pieces—is expected to be a great boon to the lumber industry. It permits gluing of small pieces into one great member of even greater strength than solid wood. A ship's knee is an example. Scores of Navy boats are being built using quantities of this material. They are far more numerous than the much publicized glass boats. Trusses that will replace steel, and truck bodies of light weight and great strength are other possibilities. Phenolic and resorcinol resins are both used in laminated wood which, small today, is on the check list for future progress.

Hardboard is a material that is expected to parallel plywood uses, but with even more application possibilities. Masonite was the first example but that material uses the lignin in the wood as a resin. The newer types are described as exploded wood fibers which are then pressed after a resin binder has been added. There are also other ways of combining wood waste and resin; all of them are much closer to large volume production than was thought possible a year ago.

It is believed that from 4 to 6 million lb. of resin were used in hardboards in 1952. An estimate for 1954 is from 6 to 10 million pounds. Recently most of the big lumber companies have announced plans for getting into this field. By 1954, hardboard should be a real competitor for plywood and many other materials. Thin boards down to 1/16 in. have been made that are intended for wall paneling or faces

for cores made from various materials.

Hardboard has so far been used largely for interior work such as doors, wall paneling, drawer backs, cores for laminates, and displays. Consequently, much of the resin used has been urea—observers think eventual poundage may be divided half and half between urea and phenolic, particularly if light-color phenolic is available. Other resins, too, are getting into the picture. A melamine surfaced hardboard is being sold in competition with high pressure laminates at a lower cost. Vinyl resins and other thermoplastics are also being tested.

Miscellaneous Uses

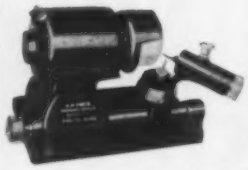
Most of the phenolic resins used in the wood waste field are supposed to be tabulated in the "Miscellaneous" category in Table B, p. 58, since they are listed as binder rather than adhesive resins.

The largest volume of the Miscellaneous classification, however, is binder resins used for rock wool and fibrous glass insulation. No figures have been published but the total is probably well over half of the 59 million lb. listed. It is known that one or two establishments have used more than a carload of resin a day, which is from 80 to 100 thousand lb. of 68% solid mixture.

Brake lining and abrasive resins are next highest in this Miscellaneous list but no figures on total use are available and estimates are so variable that they aren't worth printing.

The coming star of this miscellaneous group is expected to be resin for the shell molding process, but the star is still so far away that its glitter is barely discernible. It glittered to the extent of only a few million pounds in 1952. How fast it takes over as the most brilliant in the phenolic firmament depends on many factors. It seems now that shell molding is not for the little fellow. Only large companies can afford to put in equipment for shell molding and it is difficult to change over in a hurry. It may be years before any great number of foundry, automotive, farm implement, washing machine, and other companies convert to this revolutionary method for metal casting. It is reported that one of the automotive companies will be prepared

photograph it!
A photo record is quicker, more accurate;
and it may prove to be priceless.
THE ADVANCED single-lens reflex design of the 35-mm. PRAKTICA FX makes it easier for you to get expert photomicrographs, oscillographs, extreme close-ups, copy work, etc., in black and white or natural color. Use it for: Recording lab and field observations, quality control, inspections, photographing equipment in field, training personnel, etc. Excellent for the home photographer, too. From $99.50 to $199.50 (tax incl.).
The Praktica Co., Inc.,
48 W. 29 St., N. Y. 1, N. Y.
39 tested ideas
Free for you!
PRAKTICA
FX
35-MM. SINGLE-LENS REFLEX CAMERA
The Praktica Co., Inc. Dept. G-13
48 West 29th Street, N. Y. 1, N. Y.
Please send me a copy of "PHOTOGRAPHY IN SCIENCE AND INDUSTRY."
Name.....
Position.....
Company.....
Address.....
City.....Zone...State.....



ORDER NOW FOR 1953 PRECISION

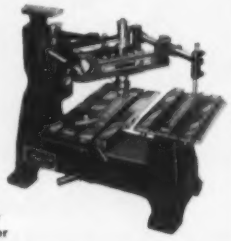
CUTTER GRINDERS

This is the famous PREIS-PANTO Model CG Single-Lip Engraving and Routing Cutter Grinder. Surprisingly low in price because of the high-production basis of manufacture. Easy to use because of simplicity of design and SURE to give true centers on your cutters.

STEEL—METAL—PLASTIC

ENGRAVING MACHINES

The Model UE-3 only weighs 100 Lbs. but was built to do the work of machines costing much more—with less operator fatigue.



PANTO

Write for color folder

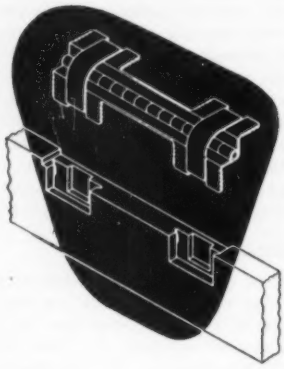
H. P. PREIS ENGRAVING MACHINE CO.

653 Route 29 Hillside, N. J.

HINGES . . .

for PLASTIC BOXES

press-fit assembly (Holds like a drive-screw) with or without double action "C" Springs



GEISSEL Mfg. Co., Inc.

109 LONG AVENUE

HILLSIDE, N. J., U. S. A.

to use as much as 600,000 lb. of resin a month starting some time in 1953, but if as much as 10 million lb. of resin is used for shell molding in 1953 most people will be agreeably surprised.

However, that doesn't mean shell molding will be a fadeout. Once two or three companies get started, others will simply have to follow in order to meet competition. At maximum use, an automobile company might use 10 to 70 million lb. of resin a year for shell molding, depending upon their degree of conversion from old fashioned sand mold casting. How soon this conversion will be made is still a matter of doubt but it is expected that two or three years will elapse before as much as a total of 50 or 60 million lb. of resin is used.

The other resins listed in Miscellaneous, all of comparatively small poundage, are for ink; other than shell molding type foundry cores; resins to make rubber last longer, as in shoe heels; resins that are sold neat to a few users who make their own molding compound; oil-well mud stabilizers; water softeners; foamed phenolic; and glues such as Cycleweld. The resin used for honeycomb core materials is included in the adhesive resin statistics and of course resins used for can, varnish, and anti-corrosive coatings are in a surface coatings classification which is not given in Table B.

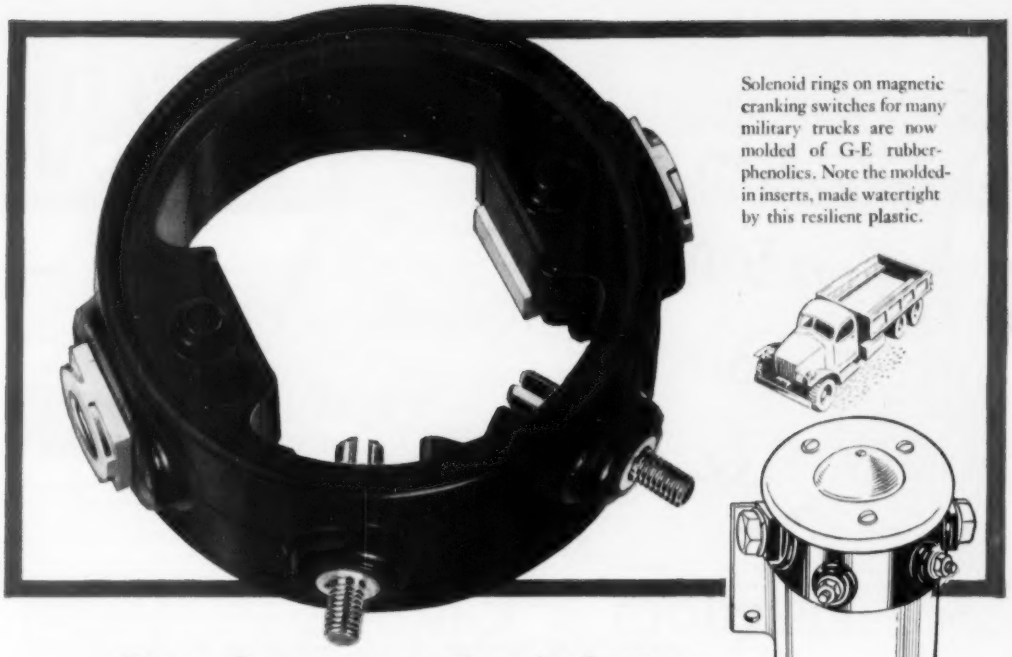
Laminates

Phenolic resin used in the high pressure laminating industry in 1952 held even with 1951, thanks to an upswing in decorative laminates, which had suffered a severe decline in 1951. Of course, melamine is used in the top sheet in decorative laminates but the core layers use phenolic.

Defense business in laminates failed to show up in any increasing quantity. This was fine for the taxpayers but not so good for the laminators. Civilian industrial laminating business showed a good pick-up in September and helped bring the industry back to 1951 levels. The 1951 spurt in military laminates was probably caused by tooling up and by pilot production on products that are simply being made ready in the event they are needed for war. The early spurt encouraged laminators to think that a lot of business was on the way but it will probably never show up until the world-wide situation changes for the worse.

Producers of decorative laminates, of whom there are now over 30, compared to only 4 or 5 a few years ago, shipped more poundage in 1952 than in any other year but there are no figures available on the total amount. They are increasing their base in the furniture field and eating into the volume of other materials used for such things as sink tops and wall paneling. A new high-grade television console is now being designed with a decorative laminate cabinet. The dinette business, once the biggest field for decorative laminates, has recovered from a bad slump in 1951 brought about by over-large inventories.

Impregnated wood is still a small factor poundage-wise. Cutlery handle business is off somewhat but the decline was no fault of the handles to function in service or stylewise. The material is getting increased attention in the electrical and textile industries.—END



Solenoid rings on magnetic cranking switches for many military trucks are now molded of G-E rubber-phenolics. Note the molded-in inserts, made watertight by this resilient plastic.

How the automotive industry benefits from SHOCK-RESISTANT

G-E RUBBER-PHENOLICS

Are *molded inserts* a problem in your plastics designs? Here's how General Electric rubber-phenolic compounds proved to be the answer where *watertight* inserts were required.

Magnetic cranking switches, with a molded plastics terminal ring, are used in military trucks. This unit has to be waterproof. The four inserts, which go right through the ring, presented a problem. *Conventional* phenolics failed to bond thoroughly to and around the inserts . . . failed to make a watertight seal.

Then a G-E *rubber* phenolic compound was evaluated. Result? This highly resilient phenolic with its nitrile rubber component *molds tenaciously* to the inserts. It knits thoroughly and provides a completely watertight seal for the ignition system.

G-E rubber-phenolics, which are *five times* stronger than conventional impact materials, are part of G.E.'s *complete* line of thermosetting compounds. For more information about them, ask your molder or use coupon below for free booklet with more details.

GENERAL ELECTRIC

General Electric Company
Section 331-1A, Chemical Division
Pittsfield, Massachusetts

☐ Please send me a free copy of "New Rubber-Phenolic Materials for Greater Impact Strength."

☐ I am particularly interested in G-E rubber-phenolics for this application: _____

Name _____

Firm _____

Street _____

City _____ Zone ____ State _____

The **FIFTH FREEDOM**

WHICH HAS HELPED MAKE AMERICA

and Freedom of Choice

...FREEDOM OF CHOICE TO BUY THE VERY BEST:

HARFLEX® PLASTICIZERS

OUTSTANDING FOR
Low Temperature Performance • Weathering Stability
Long Range High Temperature Service

For Plasticizers of QUALITY, write

HARCHEM

41 EAST 42nd STREET, NEW YORK 17, N. Y.

HARDESTY CHEMICAL COMPANY, INC.

THE KEY TO HARCHEM® BETTER PLASTICS

Manufacturers of Sebacic Acid

Canadian Distributor: W. C. Hardesty Co. of Canada Ltd., 975 Lakeshore Road, New Toronto, Canada

1. SELECT the items you want
2. CIRCLE the corresponding numbers on the post card
3. FILL IN the information requested
4. MAIL – no postage required

HELPFUL LITERATURE FREE

There is valuable data – worth dollars and cents to you – in the literature and samples described below.

EQUIPMENT • SUPPLIES • SERVICES

UNROLLS AND REROLLS. Paper discusses the construction and advantages of various types of unrolls, tensioning devices, and rerolls for web materials. Frank W. Egan & Co. **(A-301)**

CHEMICAL BLOWING AGENT. Technical bulletin on "Unicel" ND, an agent for expanding polyvinyl chloride resins into sponge-like materials. Includes chemical formulas and procedures for use. E. I. du Pont de Nemours & Co., Inc. **(A-302)**

CATCHES FOR PLASTIC BOXES. Catalog contains illustrations and data on various snap and slide-type locks and latches for attachment to plastic boxes. Presto Lock Co. **(A-303)**

PLASTICS EXTRUSION EQUIPMENT. Folder with information on the complete line of NRM plastics extruders, and equipment for film extrusion, covering wire and other specialized extrusion jobs. National Rubber Machinery Co. **(A-304)**

FIBER GLASS REINFORCED ALKYD. Data sheet contains tentative properties of Plaskon fiber glass reinforced alkyd. Includes molding characteristics, physical, mechanical, electrical and chemical properties. Plaskon Div., Libbey-Owens-Ford Glass Co. **(A-305)**

LUBRICANT AND PLASTICIZER. Technical service report on butyl stearate which may be used as a plasticizer in various coatings and wire coverings and as an anti-block lubricant in plastic finishing. Witco Chemical Co. **(A-306)**

SLITTING AND WINDING EQUIPMENT. Catalog contains bulletins on numerous "Camachines" for slitting and winding a wide range of plastic and other web materials. Cameron Machine Co. **(A-307)**

MOLD TEMPERATURE CONTROL. Case history bulletin shows how one molder employs the injection mold temperature control unit manufactured by Sarco Co., Inc. **(A-308)**

ADHESIVE FOR "STYROFOAM." Bulletin on the use of "Rez-N-Glue" to achieve transparent bonds between "Styrofoam" expanded styrene plastic and itself, and other materials. Schwartz Chemical Co., Inc. **(A-309)**

DRY COLORING STYRENE. Data on how the proper selection of colorants, formulating methods, and blending equipment can improve the color uniformity obtained in dry coloring styrene molding materials. Monsanto Chemical Co. **(A-310)**

CUSTOM THERMOPLASTIC EXTRUSIONS. Folder lists the characteristics of nine extrudable thermoplastics. Discusses various extruded forms and shapes. Anchor Plastics Co. **(A-311)**

THERMOSETTING EPOXY RESIN ADHESIVE. Folder describes the characteristics and uses of Armstrong's A-6 adhesive in bonding an extremely wide range of surfaces. Armstrong Products Co. **(A-312)**

PLASTICS PROCESSING MACHINERY. Catalog with data on accumulators, Banbury mixers, calenders, mills, pumps, and hydraulic presses for uses in various types of plastics processing. Stewart Bolling & Co., Inc. **(A-313)**

"PLIOBOND." General description of the properties and application methods for using "Pliobond," a thermoplastic adhesive for joining such diverse materials as metal, plastic, ceramics, glass, concrete, etc., to themselves and to each other. Goodyear Tire & Rubber Co. **(A-314)**

RADIANT FAR-INFRARED HEATING PANELS. Details on improved modular panels for applying far-infrared heat in all sorts of industrial applications. Edwin L. Wiegand Co. **(A-315)**

"PLEXIGLAS" MOLDING POWDERS. Booklet explains why "Plexiglas" acrylic molding powders are particularly suited for certain molded or extruded applications. Lists average physical and chemical properties. Rohm & Haas Co. **(A-316)**

MOLDING PLANT FACILITIES. Reference file enumerates the manufacturing equipment, tooling facilities, engineering services, and range of products which have been molded by Minnesota Plastics Corp. **(A-317)**

SIGNALING TEMPERATURE CONTROLLER. Specification sheet on a signaling temperature controller of resistance bulb type for use in plastics processing equipment. Thermo Electric Co., Inc. **(A-318)**

"VINYLITE" COATING RESINS. Technical bulletin on "Resin VAGH," a series of vinyl chloride acetate copolymers with a broad range of use in the manufacture of coatings and fortified coatings. Bakelite Co., Div. of Union Carbide & Carbon Corp. **(A-319)**

SHIPPING BY AIR IN CORRUGATED BOXES. Booklet differentiates between different classes of air cargo shipments and explains how corrugated cartons meet the need for practical air shipment containers. Hinde & Dauch Paper Co. **(A-320)**

POLYESTER CASTING RESINS. Data on casting with "Laminac" polyester resins. Covers the grades available, accelerating the reaction, fillers, and the effect of various cure temperatures. American Cyanamid Co. **(A-321)**

EQUIPMENT FOR FABRICATING COPOLYMER SHEET. Booklet gives list of basic equipment and plant facilities necessary for fabricating "Boltaron" copolymer sheet materials by vacuum molding and ring and plug molding. Includes investment and labor requirements and sources of supply. The Bolta Co. **(A-322)**

Fill out and mail this card now

MODERN PLASTICS

Manufacturers' Literature Service

I am interested in the following items:

A-301 A-302 A-303 A-304 A-305 A-306 A-307 A-308 A-309 A-310 A-311
A-312 A-313 A-314 A-315 A-316 A-317 A-318 A-319 A-320 A-321 A-322
A-323 A-324 A-325 A-326 A-327 A-328 A-329 A-330 A-331 A-332 A-333
A-334 A-335 A-336 A-337 A-338 A-339 A-340 A-341 A-342 A-343 A-344

If you do not now subscribe to MODERN PLASTICS, but wish to receive the next 12 issues (U.S.A., Canada & Pan America, $6; all others, $8.) just check here ☐

NAME ..... POSITION .....
(Please Print Plainly)

COMPANY .....

STREET ..... CITY ..... State .....

(Not Valid After April 1, 1953)

FREE HELPFUL LITERATURE

There is valuable data — worth dollars and cents to you — in the literature and samples described below.

1. SELECT the items you want
2. CIRCLE the corresponding numbers on the post card
3. FILL IN the information requested
4. MAIL — no postage required.

EQUIPMENT • SUPPLIES • SERVICES

EXTRUSION VINYL FILM. Paper discusses the current and future market for vinyl film, compares the cost of producing it on calenders and extruders, and illustrates the techniques for blowing vinyl film by extrusion. Naugatuck Chemical Div., U. S. Rubber Co. **(A-323)**

"AICO" PLASTICS APPLICATOR. Handy circular chart acts as a general guide to help select the most suitable plastic material for specifically required characteristics. Data on fifteen different plastic materials. American Insulator Corp. **(A-324)**

MOLDING PLANT FACILITIES. Booklet shows this company's moldmaking, and compression and injection molding facilities. Illustrations of hundreds of custom and proprietary items molded by the Waterbury Companies, Inc. **(A-325)**

INDUSTRIAL APPLICATIONS FOR FORMICA. Brochure on electrical, chemical, and mechanical end uses for laminated, molded, tubular and post-formed Formica. Chart compares properties of various grades. The Formica Co. **(A-326)**

PLASTICS FOR MAINTENANCE. Booklet covers the uses of sheet plastic materials in protective machine guards, goggles, windows, domes, models, signs, and other applications. Cadillac Plastic Co. **(A-327)**

IMPACT TESTER. Bulletin on a low-capacity impact tester for plastics and other materials which makes either Izod or Charpy tests. National Forge and Ordnance Co. **(A-328)**

"EXON" VINYL RESINS. Data on "Exon" resins, a series of polymers and copolymers of vinyl chloride having a wide range of applications. Gives test procedure for determining characteristics. Firestone Plastics Co. **(A-329)**

MODIFIED POLYSTYRENES. Bulletin lists tentative physical and chemical properties of three new modified styrene compounds and briefly explains the techniques for molding and extruding them. Koppers Co., Inc. **(A-330)**

HYDRAULIC CYLINDERS. Specifications and drawings of various cushioned and noncushioned high pressure hydraulic cylinders with bores from 1¾ in. to 12 in. Includes complete engineering data. Miller Motor Co. **(A-331)**

SILICONE FLUIDS. Booklet describes the properties and applications of various liquid methyl silicones known as "Dow Corning 200 Fluids." Dow Corning Corp. **(A-332)**

CONTROL INSTRUMENTS. Bulletin on the "Panelmount Capacitrol," an indicating and controlling instrument for temperature, voltage, current, speed, and similar variables. Wheelco Instruments Co. **(A-333)**

MOLDING AND EXTRUDING MACHINES. Brochure contains information on Stokes fully automatic and semi-automatic compression presses and transfer presses, and Stokes-Windsor twin screw thermoplastic extruders. F. J. Stokes Machine Co. **(A-334)**

DIE CUTTING PRESS. Bulletin and specification sheet on the "Tri-Power" heavy duty die cutting press made by Hobbs Mfg. Co. **(A-335)**

DRY COLORING ACRYLICS. Information on the techniques and equipment to be used for dry coloring acrylic resins and the proportions of Ferro colors necessary to obtain specified shades. Ferro Corp. **(A-336)**

LAMINATING PRESS. Details on a small self-contained laminating press for performing a variety of functions among which is sealing of cards, badges and photographs between thermoplastic sheet materials. Fred S. Carver, Inc. **(A-337)**

INDICATING PYROMETRIC PROPORTIONING CONTROLLERS. Details on the Model JP "Guardsman" proportioning controller for automatically maintaining precise temperature levels in injection molding machines, extruders, furnaces, ovens, and other units where such control is desirable. Taco West Corp. **(A-338)**

LABELING IDEAS. Brochure contains hundreds of suggestions on sizes and styles of labels for packaging and shipping. Ever Ready Label Corp. **(A-339)**

"GEON" POLYVINYL AND "HYCAR" AMERICAN RUBBER MATERIALS. General booklet on the properties of these materials together with chemical resistance and application data. B. F. Goodrich Chemical Co. **(A-340)**

PLASTICS GRINDER. Data on the American "KC" rotary knife grinder for reducing sprues, gates, rejects, and other thermoplastic scrap to homogenous granules. American Pulverizer Co. **(A-341)**

VINYL PLASTICIZER. Booklet discusses physical properties, plasticizing properties, test results, compositions, suggested formulations, stabilization, and other data about MPS-500, a new low-cost plasticizer. Hooker Electrochemical Co. **(A-342)**

THERMOPLASTIC COLORANT. Folder contains price list on metallic and PMMA opaque and transparent coloring materials for styrene and other plastics. Data on a wetting agent to increase efficiency of dry coloring. Plastic Molders Supply Co., Inc. **(A-343)**

TRACER-CONTROLLED MILLING. Booklet shows how "Keller" machines can be used in mold and die making to reduce duplicating costs. Covers operating principles, special attachments, etc. Pratt & Whitney, Div. Niles-Bement-Pond Co. **(A-344)**

Fill out and mail this card now

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

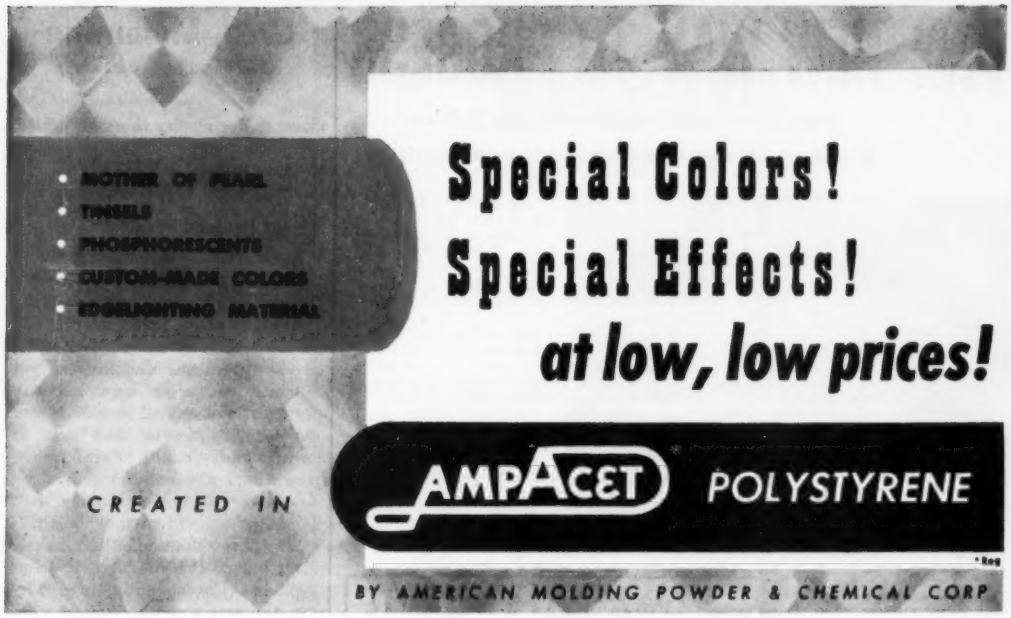
BUSINESS REPLY CARD

First Class Permit No. 2656 (Sec. 34.9, P.L. & R.), New York, N.Y.

MODERN PLASTICS

575 Madison Avenue

NEW YORK 22, N. Y.



AMPACET PEARL—the eye-catching and alluring plastics material for jewelry boxes and containers of all kinds, for clock and instrument housings, for toys and baby items, for bathroom fixtures and wall tile, for novelties and hundreds of different uses, for brushes, toilet-ware and cosmetic articles. Economical, because it blends with crystal Polystyrene. Formulated for easy molding and good impact resistance.

PHOSPHORESCENT—for products that should glow in the dark and look well in daylight. Articles made from Ampacet Phosphorescent Polystyrene retain their beautiful finish, their warm, appealing glow.

METALLICS AND TINSELS—Unusual effects of sparkling brilliance and beauty —gold, silver, copper and bronze Polystyrene, and metallic tinsel flakes imbedded in transparent plastics material.

IRIDESCENT POLYSTYRENE (EDGELIGHTING MATERIAL)—the two-tone effect successfully employed for edge lighting in advertising display material.

COLOR
can help launch a new product dramatically

COLOR
can put new sales appeal into an old product

We custom color to your specifications — colors are matched accurately and kept constant time after time.

Also Manufacturers of AMPACET Cellulose Acetate and Ethyl Cellulose Molding Powders

TRANSPARENTS • TRANSLUCENTS • OPAQUES
FOR INJECTION MOLDING AND EXTRUSION

Complete flow range — manufactured to the most rigid specifications

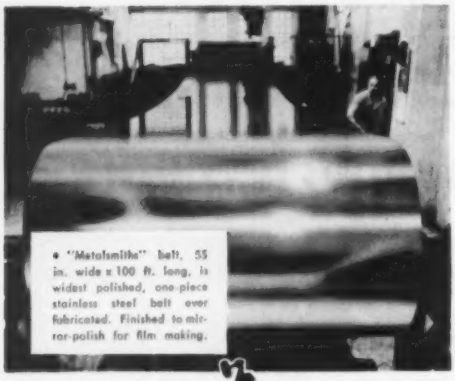
AMERICAN
MOLDING POWDER
and CHEMICAL CORP.
AN AFFILIATE OF A BAMBERGER CORPORATION

703 BEDFORD AVENUE, BROOKLYN 6, N. Y.
Phone: MAin 5-7450 • Cable: CHEMPROD BROOKLYN

Can You Use This

NEW WAY TO PROCESS

Plastics—Latex—Film—Foam Rubber
Resins—Leather—Compounds and Coatings



• "Metalsmiths" belt, 55 in. wide x 100 ft. long, is widest polished, one-piece stainless steel belt ever fabricated. Finished to mirror-polish for film making.

"Metalsmiths" Stainless Steel (18-8) Endless Belts furnish a dense, corrosion-free, highly-polished surface that provides a faster, cost-cutting method of continuous processing.

Your products pick up a high-gloss finish as they move through cooling and conditioning, while setting is improved.

"Metalsmiths" stainless steel belts are welded endless to any desired length and width, all welds finished to belt thickness. Width and camber are controlled. Polished to suit needs.

Consult our engineering department on possibilities for your products, without obligation.

METALSMITHS, Div. of Orange Roller Bearing Co., Inc.
558 White St., Orange, N. J.

METALSMITHS
STAINLESS STEEL
ENDLESS CONVEYOR BELTS

Your Blueprint in Plastics

CMP

LOW PRESSURE
INJECTION
PLUNGER
TRANSFER
COMPRESSION

Consolidated molded products corporation
SCRANTON 2, PENNSYLVANIA
SALES ENGINEERING OFFICES IN NEW YORK, BOSTON, BRIDGEPORT, DETROIT, PHILADELPHIA, CLEVELAND, MILWAUKEE, INDIANAPOLIS

Urea, Melamine

(*Continued from pp.* 59-60)

closures during the shortage period and proved so popular that the bottle man never returned to his old favorite when it became available.

Wiring Devices

A determined promotional effort to obtain a greater share of the wiring device market by making the public aware of urea's color possibilities was started in 1952. Results are by no means definitive as yet but such campaigns require a long period of educational service before the idea begins to take root in householders' minds. Furthermore, contractors who build large housing developments are extremely cost conscious and when they buy fixtures by the thousands they nearly always buy the lowest cost items available. Consequently, urea wiring devices are seldom found in low or medium cost new houses.

Urea for larger housings should be expected in larger volume. It is believed to be only a matter of time before it enters the TV field in cabinet form. Cost may have something to do with the hesitancy to develop more large housings, and there are thoughts about shrinkage after aging that sometimes create doubt. Producers, however, feel that both of these factors, especially shrinkage, are overemphasized. They can show any number of old, heavy walled, highly ornamented radio cabinets with nary a crack in them as proof. And in Canada where urea toilet seats have been commonplace for years the producer guarantees them for 10 years. Urea toilet seats have never been produced in any volume in the United States but several companies are now working on them and it would be no surprise to find them on the market in good quantity before long. Urea has several advantages over other materials for this purpose. Urea molded products are not affected by splashing or spilled cosmetics, they have a hard surface that won't scratch, and they have solid color. But urea toilet seats will have to sell at prices ranging up to as high as $15 a seat (solid molding in contrast to shell or wood core types) and price limits their volume appeal.

Another development under way

is a housing for ventilating fans of the type used in kitchens. These are now mostly in metal or thermoplastic but urea would be easier to keep clean and accumulates no static to attract dust.

Radio Cabinets

More radio cabinets are now being made from urea than a year ago but volume is still small—competition from wood, sprayed phenolic, and polystyrene (in portable sets), is largely on a cost basis. This cost factor makes doubly significant the discussion at the beginning of this chapter concerning the possibilities of lower cost material

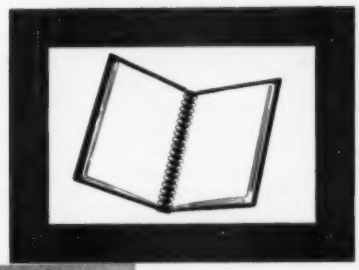
Urea and melamine adhesives sold in good volume last year but profits were nil or less. A vicious price war hit the industry even before 1952 while the furniture industry was in the doldrums. This situation may have been caused by the low cost of raw materials used in production of urea glue and the small capital needed to set up a business. As a result, numerous companies were created, all striving to get into a limited market. At this writing the situation is critical and no remedy is in sight.

Urea glue is used primarily for hardwood plywood and furniture in the Southern lumber regions. It is a growing market with much promise if the price situation is ever straightened out.

Coming along also at a fairly good rate is the development of hardboard or a mixture of wood waste fibers and resin. Some 4 or 5 million lb. of resin are thought to have been used for this purpose last year and about half of that is estimated to have been urea. This type material is expected to have a great future since it can be used to take the place of plywood in many applications such as doors, cores for laminates, drawer backs in furniture, and other products of that nature.

Since hardboard is largely for interior use, urea and melamine glues seem ideally fitted for the purpose. This development is worth close watching. It has been extremely slow getting started but lumber companies in the Far West and South are planning to enter the field in a big way. By 1954, hardboard should require several times the amount of resin now being used for hardwood plywood.—END

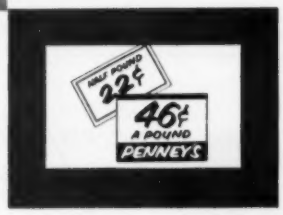
for Vinylite BRAND rigid sheets



at mill prices

and prompt delivery

call Cadillac now



Get your VINYLITE Brand Plastic Rigid Sheets from Cadillac—the largest plastics warehouse in the United States! Order them in any quantity—at any time—and pay only *mill prices!* You're sure of fast, dependable low-cost service from Cadillac!

There are scores of uses for VINYLITE Rigid Sheets—displays, signs, price tags, book bindings. They are strong, moisture-resistant, easy to clean—won't warp, crack, or fray. They can be multicolor printed, then heat-formed to three dimensions. Transparent and translucent grades can be lighted from behind. Whether you want VINYLITE Rigid Sheets in large or small quantities, call on Cadillac. Write Dept. MP for the latest catalog on VINYLITE Rigid Sheets and other materials.

Representatives in principal cities

cadillac plastic company

15111 Second Boulevard • Detroit 3, Michigan

Chicago Warehouse — 727 W. Lake Street

Chicago, Illinois

Vinyls

(*Continued from pp. 60-4*)

It is successes like these that make vinyl producers confident of the future. They have been struggling for five years or more to conquer this market and the result now seems assured.

Coated and Sheet

The story on vinyl-coated fabrics is told in Tables D and E. The business is fairly evenly divided between calendered and spread coated material, although the latter has been increasing its percentage each year. Coated fabric keeps edging into certain portions of the upholstery market for solid sheet materials because it can be stitched without danger of tearing, but the sheet then moves into other fields and so far has not suffered from a volume standpoint. It is estimated that about 85% of spread coated fabrics use plastisols or organosols, but most of the plastisol coated cloth is topped with a solvent vinyl coating for hardness. Light fabrics such as those used for baby pants are often coated with a vinyl surface laid down with solvent.

Now that plastisols or organosols have become almost standard for spread coated fabrics, the biggest improvements seem to be in the backing material which is becoming lighter and stronger, thus permitting better drape and appearance. An elastic-type backing and a felted nylon material were introduced in 1952. Cellulosic backings have also been adopted for luggage material to give an economic advantage.

Molding and Extrusion

The molding and extrusion division of the vinyl industry has been the leading outlet for the last two years. It includes rigid vinyl, slush molding, elastomeric molding, phonograph records, wire coating, and all other extrusions.

Wire coating is by all odds the biggest portion of this volume. Estimators vary on exact quantity. One group says it has expanded from 35 million lb. of resin in 1951 to 45 million lb. in 1952. Another group says it has increased from 40 million lb. to almost 60 million pounds. The military take is believed to be about one half, which would be an increase of 5 to 10% over 1951. One military program alone has taken at least 1 million lb. a month since March, but will taper off in the middle of 1953.

It is believed that 1953 will at least equal or better the 1952 record, despite a drop in military consumption. The loss will be made up in expansion of present uses and adoption by new fields in the civilian market. About 90% of the small wire used in homes is now vinyl insulated and vinyl is expected to reach 10 million lb. a month in this field.

About 160 million ft. of vinyl garden hose was produced in 1952 compared with 140 million in 1951. At 8 lb. of compound per 50 ft. of hose, that is about 10 to 12 million lb. of resin for 1952. At the last hardware show, about 25 exhibitors presented vinyl hose, compared to five or six with rubber hose—if our count was right.

Other extruded parts, such as elastomeric moldings and gasketing for automobiles, take between 5 and 10 million pounds. Plastisol slush molding also consumed between 5 and 10 million pounds. The balance is in phonograph records and other types of rigid vinyl. Rigid vinyl sheet

Beryllium Copper
PRESSURE CASTINGS
by **FEDERAL**

- Multiple cavities and cores of intricate shape
- Raised letters that can not be hobbed in steel
- Corrosion resistant—long wearing
- Compressive strength over 200,000 PSI
- Thermal conductivity over twice that of steel

Write for Free Illustrated Folder Today

FEDERAL TOOL CORPORATION
3600 W. Pratt Blvd., Chicago 45, Illinois

Determine the resistance of Rain, Heat, Sunlight and Thermal Shock of materials intended for outdoor use

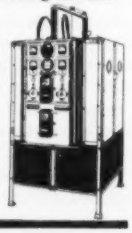
A few days' testing in the Weather-Ometer is equivalent to months of exposure in actual use.

ATLAS
WEATHER-OMETER

The operation of the Weather-Ometer is fully automatic. After setting exposure cycle on the cycle timer unit, the machine may safely be left in continuous operation over night without attention other than to replace carbon electrodes.

The Carbon Arc, the closest known duplicate of sunlight both as to intensity and spectral distribution, is used in all Atlas Weather-Ometers as the source of radiation. Water spray, thermal shock, temperature control, and light exposure periods are all regulated automatically according to test requirements.

Both original research testing in designing new products and daily testing for quality control in production are performed by the Weather-Ometer with equal assurance of positive dependable results.



ATLAS ELECTRIC DEVICES COMPANY
361 W. Superior St., Chicago 10, Illinois

For over a quarter of a century makers of
WEATHER-OMETERS · FADE-OMETERS · LAUNDER-OMETERS

has not grown much, although sizable quantities are used for maps; and such things as templates for airplane design, playing cards, table mats, rulers, displays, etc., take a fair quantity. Vacuum molding may eventually broaden these fields to include more signs, panels, trays, and other outlets.

Rigid vinyl for pipe and various moldings is one of those things about which there has been more talk than production. From 1 to 2 million lb. may have been used for pipe and duct work in 1952. Producers insist that patience is the ingredient most needed to produce results here. After all, paste resin was announced in 1946 but did not really get started until 1950, and it will take time to get rigid vinyl on the road. Two or three molders are now making fittings for pipe; fittings have been one of the missing links in the promotion of plastics pipe.

Rigid vinyl material also looks promising as a sheeting for outdoor use—even for gutters and sheathing on homes. But such developments are probably at least five years away.

Foam

Vinyl foam is another material that failed to progress very far in 1952. It may come into good volume for flotation equipment in the Navy, but civilian uses so far have been limited, possibly because of cost as compared with foam rubber.

The "All other" group in Table D includes primarily exports and coating type resins. Exports were down in 1952. One of the coating materials is the base for a roofing compound that has attracted interest; another is used as a caulking compound. The use of vinyl for paint has not even started—it may take years to get going, but great possibilities are predicted.

Plasticizers

Plasticizers of the type used in vinyls in 1952 are estimated to have reached between 165 and 170 million lb. in 1952 compared with 155 to 160 million in 1951. These figures include exports, which decreased sharply in 1952 and may never increase again since plasticizer as well as vinyl plants are being built throughout the world.

Of this amount, some 100,000,000 lb. is estimated to be dioctyl phthal-

Why TRI-STATEWARE uses Kum-Kleen labels!

WHY LABEL WITH Kum-Kleen — A Kum-Kleen informative label *spotlights* and identifies every Tri-Stateware plastic product! It's the original *self-adhesive* label . . . stays stuck on plastic surfaces, yet can be easily removed at the point-of-use. Kum-Kleens stay neat and attractive in spite of rough usage.

Kum-Kleen LABELING IS MORE ECONOMICAL — Patented Avery dispensers . . . manual or electric . . . feed die-cut labels off roller tape, ready for quick, clean labeling. No expensive equipment costs. Many users report labeling speeds up to *5 times faster* than with other methods!

Kum-Kleen LABELING IS FASTER — Avery Kum-Kleen pressure-sensitive labels are LAID ON *fast* with a finger-touch. It's easy . . . no moistening . . . no soaking . . . no heating . . . no mess! They stick to any clean smooth surface.

Kum-Kleen APPEARANCE — Even under temperature and humidity extremes Kum-Kleens will not dry out, peel, pop or curl. No sticky fingers — no excess glue — no water or mess to clean up!

Kum-Kleen LABELS ARE USED FOR: Help-Sell Features. How-to-use-it data. Nameplates. Trademarks. Instructions. Guarantees. Approval Seals. Diagrams. Inspection. Routing. Prices. Caution. Repair Jobs . . . and many others.

Kum-Kleen — the original pressure-sensitive label — is a product of

WHERE can you use these labels in your business?

AVERY ADHESIVE LABEL CORP.

117 Liberty Street, New York 6 • 608 S. Dearborn Street, Chicago 5
1616 So. California Ave., Monrovia • Offices in Other Principal Cities

☐ Please send case histories, free samples and prices.
☐ Have the Avery label man call.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

PLASTIC SCRAP

ANY QUANTITY OF
VINYL . . . .
POLYSTYRENE . .
Polyethylene
Ethyl Cellulose
Acetate
Butyrate

WE BUY IT . . . and Pay Promptly
WE SELL IT . . . at the Lowest Prices

Let us be your MID-WEST HEADQUARTERS for the Purchase of Your Plastic Scrap . . . or Your Most Dependable Source for Plastic Scrap.

FOR PROMPT ACTION . . . WRITE • WIRE • PHONE

TP
THERMO-PLASTIC CORPORATION
2911 S. Archer Avenue, Chicago 8, Illinois
Phone: CLiffside 4-0077

Plastic or Celluloid Fabricating Equipment

1 FOUR TON, AIR OPERATED TOGGLE PRESS
2 POWER JIG SAW
3 BEVELER
4 HAND LEVER PRESS
5 ELECTRIC STEAM TABLE
6 DEGATOR

Designers and builders of INJECTION MOLDS

STANDARD TOOL CO.
83 WATER STREET, LEOMINSTER, MASS.
Outfitters to Plastics Mfrs. Since 1911
OMNI PRODUCTS CORP., Export Distributors, New York, N.Y.

ate type, the most commonly used vinyl plasticizer. Octyl decyl phthalate types came into the field in much greater volume than ever before and apparently have had a good reception because of their low volatility and low temperature brittleness point.

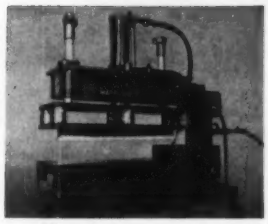
Dicapryl also came into the picture as a low cost plasticizer because there was plenty of phthalic anhydride to match with accumulated stocks of capryl alcohol; but processors have shown little indication so far of giving it widespread adoption.

Phosphate types, exclusive of tricresyl, probably increased by a greater percentage than phthalates because of demands for flame retardance and better flexibility at low temperature. Military demands for low temperature flexibility have forced more attention on this property with consequently increased activity. Trioctyl phosphate, which provides flame resistance and flexibility at extremely low temperatures, is now in good supply and its availability has resulted in processors learning how to use it more successfully. Brittle points of $-70°$ C. have been successfully attained with vinyl using this material in comparison with $-32°$ C. for DOP and $-3°$ C. for TCP. Since trioctyl phosphate is also fungus-resistant and completely compatible with vinyls at low temperatures, it can be used as a single plasticizer in a compound.

The sebacates, azaleates, and adipates held about even in 1952 with 1951. Dioctyl sebacate undoubtedly increased since more was made available when production capacity of sebacic acid was expanded. They, too, are used to improve low temperature brittleness of vinyls, but are not fungus-proof and have a tendency to become incompatible at higher concentrations. Consequently, they are blended with other plasticizers. All low-temperature plasticizers have a tendency to make vinyl more supple and are thus desirable where hand and drape are wanted.

Polymeric plasticizer use probably increased about a million lb. due to the emphasis on increasing needs for plasticizer permanence in special compounds. There were some shifts in types of polymeric being employed, but the over-all volume was not particularly affected.—END

electronic sealers
by Mayflower



FOR ZIPPERS FOR INSTANCE—
This open jaw press was designed especially for fast, accurate handling of zipper applications. Its construction affords a clear view of the entire sealing area. Its versatility makes it readily adaptable to many types of sealing operations.

Manufacturers with problems in the production of heat sealed plastics turn to Mayflower for solutions. Mayflower custom designs and builds hi-speed electronic sealers to do jobs no other sealers can. These machines, using famous Mayflower power generators, provide practical methods for mass production.

If you would like to simplify your electronic sealing of plastics and reduce labor and manufacturing costs, ask Mayflower for recommendations.

Mayflower ELECTRONIC DEVICES Inc.
Only Manufacturer of Both Bar and Rotary Electronic Heat Sealers
6014 Hudson Blvd. West New York, N. J.

It's modern ...if it's plastic
Keep Pace with an
Ever Ready Label

For best design, labor-saving and practical application of labels . . . at prices in keeping with modern needs, be sure to call on EVER READY!

Free!

Ever Ready is in the forefront of labeling development, collaborating closely with leading manufacturers in the paper, plastics, adhesives and related industrial fields . . . improving standard lines and developing new ones. Every facility, mental and mechanical is here at your service. There is no label problem that can't be solved at EVER READY. That's the challenge . . . accept it please!

♦ Send for Ever Ready IDEA-BOOK

Ever Ready Label Corp.
357-361 Cortlandt St., Belleville 9, N. J.

Polystyrene

(*Continued from pp. 64-5*)

used to dress up the product to improve appeal. Cigar boxes for ten units are now on the market, also to dress up a product without increasing cost. The whole field is a likely one for expansion.

Then, too, wall tile shouldn't be overlooked as a constantly increasing volume product. Sales are thought to have increased about 30% over the 25 million lb. mark in 1951, with improved designs and more ease of handling adding to customer appeal. Some molders who specialize in wall tile say that their business doubled in 1952 over 1951. Orders coming in today are larger than ever received before. If present sales patterns continue, 1953 sales may run anywhere from 50 to 100% more than 1952, which makes a 50 million lb. or more year in prospect. A promotional program is being planned for 1953 by the wall tile industry which will particularly emphasize the Bureau of Standards' Commercial Standard 168-50 which has been a major factor in the acceptance of styrene wall tile as a satisfactory construction material.

Modified styrene film and sheet is now on the market after several years of experimentation. Some of it is—or was, at last report—listed at 55¢ per lb. in sheet form, 40 in. wide and in thicknesses of 0.040, 0.060, and 0.080 inch. It is especially recommended for vacuum molding.

Film and Sheet

Regular polystyrene film 3 mils thick in oriented form is now on the market as a shelf lining material that can be creased and stay flat without curl. A similar material is being used for table mats in 3 to 10 mil thickness, and is already in use for a type of transparency used in advertising. Other end uses for oriented styrene film are found in battery parts and toys.

This oriented film or sheet is flexible; will withstand heat in the range of 170 to 180° F.; and is not affected by moisture or humidity. In 15 mil thickness it is used as a Venetian blind slat. In thin sections it is being used as a spiral wrap in a battery. It could well be that film and sheet may yet become a good volume outlet for polystyrene resins.

Decisive Year

The year 1953 may become a decisive year for polystyrene. With plenty of material available and a rising national economy predicted for the first 6 months at least, the year may serve as a guide to determine just how fast polystyrene can grow when there are no handicaps to harass producers or users. A full scale refrigerator production program and the big new television demand in the offing, with thousands of styrene masks required, should certainly give the material a base for operations that wasn't present in 1952 and should provide the springboard for a production level never approached before.

Three or four companies not now involved in polystyrene or monomer production have received Certificates of Necessity permitting them to build new plants at rapidly amortized tax rates but there is no indication of when any of these plants will come into production. It's doubtful that any of them will be ready in 1953.—END

Hand your headaches to "CUBEE"

curing Plastics Problems is his business!

Take advantage of experience the next time you have a problem involving Plastics. Five of the key people here have a total of more than 75 years experience in this business. We offer all of the services you need—designing, die-making and molding—all under one roof. It pays to utilize our "know-how." After all, Plastics is our business. Call "Cubee" the next time you are planning in Plastics.

QUINN-BERRY CORP.
2611 West 12th Street
ERIE, PENNSYLVANIA

Q-B Says:

"The next time you are stymied
And a problem's got you down,
Hand your headache to Cubee
He can wipe away that frown."

Branch Offices:
HARRY R. BRETHEN, 18 Lawrence, Detroit 2, Michigan, Townsend 8-2877 • JOHN WEILAND, JR., 7108 Grand Parkway, Milwaukee 13, Wisconsin, Greenfield 6-7161 • H. B. COLLINS, JR., Fairport Road, East Rochester, New York, Hillside 4382 • AUSTIN L. WRIGHT, 24 Decatur Road, Havertown, Penna., Hilltop 7-0346

Quinn-Berry PLASTICS

VINYL PLASTISOLS

MICCROSOL, a product of Michigan Chrome & Chemical Company, is a true vinyl plastisol which can be readily adapted, through special formulation, to meet the strictest requirements for: dipping, casting, slush molding, etc.

We will be pleased to submit a sample of one of our many proven coatings, or engineer a vinyl plastisol for your product.

Send us full particulars.

Custom Engineered by

MICHIGAN CHROME & CHEMICAL CO.

MICCRO Products

8611 Grinnell Avenue
Detroit 13, Michigan

Cellulosics

(*Continued from pp. 65-6*)

The biggest potential for acetate film, however, still remains in packaging. In the last year it has proven highly acceptable as an overwrap on trays for grapes. Package shipment of this kind is claimed to save 20% in grapes which were formerly lost in bulk shipment. Tomatoes, lemons, and limes now frequently have an acetate wrap instead of cellophane because of breathing and anti-fogging properties. Spinach is wrapped in acetate on the West Coast, but not on the East Coast because service to customers is not fast enough in the East. Lettuce is still a question mark; browning of the leaves is a big problem. A new machine for wrapping lettuce that will be in operation next spring may solve the problem of which type film to use for lettuce.

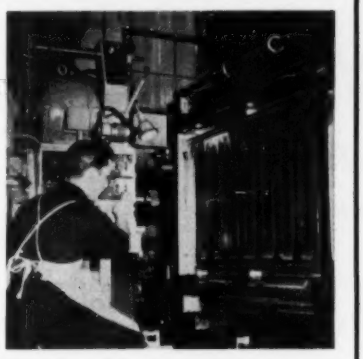
Packaging of chicken parts which looked so promising a year ago is still in a marketing development state. Chickens frozen at the packing house are wrapped in many kinds of film—polyethylene, Cry-O-Wrap, cellophane, or waxed paper—but chicken parts intended for immediate sale and wrapped at the store level are packed in acetate on the West Coast and cellophane on the East Coast. The difference seems to be a matter of service from the package maker.

There are cynics who claim that acetate film shows its greatest prosperity only when cellophane is tight, but the packaging field is so large and diverse and has so many different requirements that acetate film producers feel confident of finding an evergrowing market where their product will give properties particularly applicable to the packaging of certain types of produce.

Cellophane production has been estimated at 295 million lb. for 1952; 280 million lb. for 1951; and 260 million lb. for 1950.

Competition

Acetate's problems with cellophane competition are, of course, largely induced by a difference in price. For that reason it will be interesting to watch the progress of processors who are now mixing acetate flake and plasticizer in the extruder and producing film. Most film



One of our large molds, now under construction, will weigh approximately 10 tons.

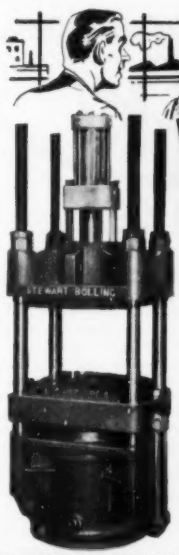
EAGLE
TOOL AND MACHINE CO.
EVANS TERMINAL ROAD
HILLSIDE, N. J.
•
TELEPHONES:
ELIZABETH 4-1515-16
SINCE 1918

PLASTIC MOLDS

LARGE MOLDS OUR SPECIALTY

Our new modern plant and added facilities are now at your disposal to satisfy all your plastics mold requirements.

We supply complete engineering coverage on INJECTION, COMPRESSION, TRANSFER, PLUNGER and LOW PRESSURE polyester applications.



YOU, GENTLEMEN, TELL US!

What are your press requirements? Here is a Bolling 24" x 24" 150-ton transfer molding press with pull-back and transfer cylinders mounted. The head is adjustable to height. This size unit can be furnished also for 200- and 250-ton pressures. A range of sizes is available from 14" x 14" for 75 tons to 48" x 48" for 1200 tons.

☆ ☆ ☆

These rugged Bolling presses can be made to suit any size or pressure requirements. What, gentlemen, are your specifications?

☆ ☆ ☆

Ask on your letterhead for Bolling's latest 64-page catalog.

STEWART BOLLING & COMPANY, INC.
3196 EAST 65th STREET • CLEVELAND 27, OHIO

B INTENSIVE MIXERS • MILLS • CALENDERS
REFINERS • CRACKERS • HYDRAULIC PRESSES
PUMP UNITS • BALE SLITTERS • SPEED REDUCERS

BOLLING MACHINERY FOR PROCESSING PLASTICS

Bolling offers you a specialized line of modern, accurate, dependable machines for the processing of plastic materials. Included particularly are the widely used Bolling Spiral Flow Intensive Mixers; 2-roll mixing and warming mills; 2-, 3- and 4-roll calenders, and hydraulic presses of the compression and transfer types. Bolling's advanced construction methods and engineering counsel are at your command.

Plastic molded handbag

gets a NEW look

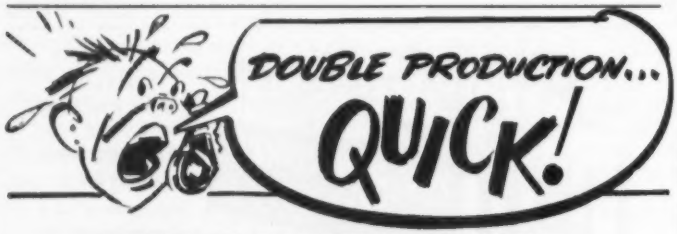
with Nacromer

Handbags, as well as many other products made of plastic, have been made more attractive, more sales-tempting with the addition of Nacromer. Nacromer is the low-cost substitute for pearl essence, providing a brilliance and lustre almost comparable. Nacromer may be mixed directly into the plastic in the Banbury or on a set or rolls. It is stable, inert, and blends easily. There's a Nacromer formulation for every plastic. For a generous working sample, write today, describing your plastic compound.

THE Mearl CORPORATION

"World's largest producer of Natural Pearl Essence"

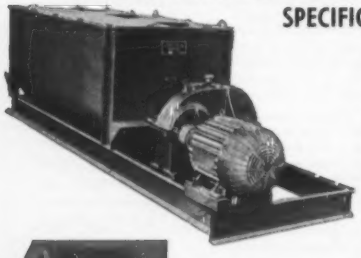
151 WAVERLY PLACE NEW YORK 14, N. Y.

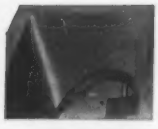


THE BAILEY MIXER

- FOR A BETTER MIXING JOB —
- THE WAY TO REDUCE OPERATING COSTS

SPECIFICALLY ADAPTED TO PLASTICS!





ROUNDED CORNERS for quicker—more complete cleaning to assure pure dyes every time!

THE BAILEY MIXER ELIMINATES SOLIDIFYING ON HOT SURFACES! New—you can pre-mix before loading into your banbury or calender—shortening cycle time—increasing production and boosting efficiency all along the line.

Here is up-to-the-minute construction with the very latest improvements in details. More efficient cleaning—empties quicker—more thoroughly—more basic body support—new mixing element—increased mixing intensity.

Write now for full details and the many reasons why such companies as Monsanto, American Cyanamid, Borden, Ross & Roberts, Resiloid, Ideal Plastics, Armstrong Rubber, and others—all use Bailey Mixers! We have a complete line of scrap preparation equipment including sifters, cutters, shredders, batch dumpers, and others.

R. N. BAILEY CO., INC. 11 W. 42nd St. New York 18, N. Y.

is extruded from molding powder. If the molding powder step can be eliminated, a great saving might be made with a corresponding reduction in price.

Ethyl Cellulose

Ethyl cellulose and Valite (bagasse) materials had a rough year in 1952. The latter, used almost exclusively with ethyl cellulose and other materials for phonograph records, suffered when that market declined and producers experimented with other materials.

Ethyl cellulose was buoyed up in 1951 by a spurting military demand for rocket inhibitor strips, walkie talkies, sonobuoys, and a few other applications. Military flashlights were not included, for the Armed Services still have a large inventory of the latter item. However, for some reason or another, ethyl cellulose did not grab off much of the civilian flashlight market.

Ethyl cellulose seemed to be hit harder by the big inventory hold-over than almost any other plastic. Very little was purchased from producers in the first six months of 1952, even though a considerable quantity was being processed, especially for the military. In August, sales of molding material started to pick up again.

There has been some talk in the industry that one producer of ethyl cellulose wanted to stop production completely a year or so ago, but was persuaded by the government to continue because of need for ethyl cellulose in case of an emergency. It seems to be recognized that straight ethyl cellulose must always be high in cost and, therefore, subject to only a limited market. However, it is interesting to note that ethyl cellulose is compatible with a host of other materials, such as wood flour, the Silvacons, clays, and Vinsol—all of them very low cost materials. If successfully combined with one or another of these materials, a modified ethyl cellulose molding material might be lower in cost than 18¢ a pound, and even tougher than the present ethyl cellulose Vinsol phono-record which can be dropped on a concrete floor without breaking. The color would have to be dark, but a thermoplastic at less than 20¢ a lb. would undoubtedly find many applications regardless of color.—END

Polyethylene

(*Continued from pp. 66-7*)

strength, feel, or drape yet such film makes a very good tablecloth cover. For a one-time protective garment bag used by the dry cleaner to return clothing to the customer, it is ideal. A one-time rain cape for patrons at ball games and other outdoor events is another possibility. Raincoats made for the Army gave good service in the tropics but to be satisfactory they should be quite thick, 6 mils or so, and would then be too stiff for most civilian tastes.

An unusual use that may eventually require thousands of pounds of polyethylene film is in shredded form for use in air conditioning air filters. When such filters get dirty, they can be taken out and cleaned by squirting with a hose.

Plus Paper

When extruded on or adhered to paper, polyethylene makes an excellent packaging material for frozen foods and humus and other hygroscopic materials. It isn't likely to get far in the cement bag field, however, until the price is reduced. For a time last year a good portion of the multi-wall bag field was lost to asphalt, but seems to have come back again because polyethylene will do a better job. Fifteen or so companies had put in extruders for this purpose before Korea. The late ones got nowhere when the scarcity cut off polyethylene supplies, but they are now ready to resume operation.

Molded Parts

Molded polyethylene parts have hardly begun to fulfill their potentialities. The material's lightness is a dollar-saver—260 can enclosures or 15,000 square inches of 2-mil film can be made from one pound. In many respects, polyethylene is the easiest of all thermoplastics to mold. Molding temperatures—from 300 to 500° F.—adapts the material to a wide range of conditions. Excellent flow characteristics permit molding thin sections. Unbreakable toys, for example, present tremendous possibilities.

Perhaps the most unusual large molded piece of polyethylene is the 15-gal. Karbox carboy which is about 16 by 16 in. and 2 ft. high,

need precision-molded
plaskon alkyd parts in your
hands in a hurry?
Two requirements most important to purchasers of automotive electrical parts—mass-production to close tolerances and on-schedule delivery—are taken right in stride by PRP. This is well typified in the piece pictured, a switch box for automatic window controls used on top-name cars. PRP produces these parts to exacting specifications with tolerances as low as ±.001 for Detroit Harvester Company's Dura Division. Plaskon Alkyd 420 provides the low shrinkage essential to maintained dimensional stability . . . and to continued smooth operation of the intricate controls. Finished parts are in the customer's hands as fast as needed due to special high speed equipment tailor-made for this type of material.
Our plane is always waiting to speed you here for a discussion of your specific parts problems.
when you look for
plastic moldings, look first to
Plastic Research Products
Urbana, Ohio
PRP

THE PACKAGING FIELD— A BIG MARKET FOR PLASTICS

"Big market," is right! The men who select the materials used to package the output of 45 of America's biggest industries control a market that may hit the 10 billion dollar mark this year.

Typical of the 45 industries that comprise this rich market are companies which manufacture and package foods, cosmetics, chemicals, drugs, candies and tobacco products. In all these highly competitive industries frequent packaging changes are the order of the day. Factors ranging from fascinating sales appeal to plain hard costs influence the men who make the packaging decisions. Consequently, no one type of packaging material (glass, metal, paper or fabric) ever has assurance that it won't be supplanted by another.

And now plastics have entered the arena as directly competitive materials for packaging. In just the last few years they have come to play an increasingly important role —and often at the expense of older, "traditional" materials.

Especially noteworthy is the fact that plastics can be used in the manufacture of almost every basic package type: box, bag, bottle, drum, jar, vial or collapsible tube!

Right now this frontal invasion of the packaging field by alert plastics manufacturers, molders, laminators and fabricators has just begun. And their chief sales tools are the two publications which reach the men who make packaging decisions in all 45 industries—MODERN PACKAGING Magazine, issued monthly, and the annual MODERN PACKAGING ENCYCLOPEDIA.

Details about the Market

Additional data on using these media to help expand your sales to the packaging market are contained in the booklet "Facts about MODERN PACKAGING and the Packaging Market." Write for your copy.

MODERN PACKAGING

575 MADISON AVENUE NEW YORK 22, N. Y.

molded in two halves, to be used for chemical shipments. See page 151.

Other molded items now in use are pump packing rings, shoe counters, trash baskets of 9½ in. diameter, and paint can protectors.

Of great promise in the near future are battery parts, including molded bars, vent plugs, and separator plates. The battery case itself may soon be molded of polyethylene. One producer has already used as much as 20,000 lb. a week for battery parts.

Dishware is probably the largest volume use for all molded polyethylene today and is increasing rapidly. As much as 180,000 lb. a month were used for rigid containers during the Government allocation period. Most of this was for containers used in refrigerators.

Blow-molded bottles are perhaps the most fascinating applications—both product- and volume-wise—in the molding part of the industry. Some 80 million were estimated to have been produced in 1952. Jars for cosmetics are a newer development along this line. Some 3 to 5 million gross of jars will be produced in 1955 and it is figured that polyethylene may capture about ⅛ of that market but it's anyone's guess as to how much of the bottle market can be secured. Bottles range in size from 1-oz. to 13-gal. carboys. Blow-molded 6½- and 13-gal. carboys are covered by ICC-IF specifications. One type bottle is now being used to help sell auto batteries which are shipped dry. The fluid is sold separately in a chemically resistant polyethylene bottle so that the customer can pour it in at the time of purchase, thus being assured of a fresh battery. Dealers say this will revolutionize auto battery merchandising; the battery producer thinks it will eliminate fluctuating seasonal production problems.

Polyethylene monofilament is also still around after years of experimentation and may yet reach sizable volume. Tow targets for the Air Force are made of woven filament, and rayon or cord spirally wrapped with unoriented colored monofilament is now being used for such things as woven hand bags.

The list of possibilities never seems to end. No wonder folks get excited about polyethylene—the Wonder Boy!—END

Du Pont Announces . . .

HIGHER WET AND DRY STRENGTH IN

GLASS FABRIC LAMINATES

NOW POSSIBLE WITH NEW PROCESS FOR USING

Du Pont "VOLAN"

METHACRYLATO CHROMIC CHLORIDE

Laminates made with glass fabric treated with "VOLAN" by the new method exceed the new rigid requirements of military specification MIL-P 8013 (USAF)

A new method for applying "Volan" to glass fabrics—developed by Du Pont—now enables you to improve both wet and dry strength of glass-fabric-reinforced resins. Glass fabric (181 style) properly treated with Du Pont "Volan"* Methacrylato Chromic Chloride will produce laminates with dry flexural strengths in the range of 70,000 to 74,000 psi. Boiled for three hours and tested wet, these laminates show flexural strength of 55,000 to 60,000 psi.!

MAIL COUPON FOR FULL DETAILS. We'll send you complete data on "Volan"—how it helps produce strong laminates when applied by the new method—sources of supply of glass fabrics treated with "Volan." Just fill in and mail coupon today. *REG. U.S. PAT. OFF.

Du Pont "VOLAN"

METHACRYLATO CHROMIC CHLORIDE

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department
Wilmington 98, Delaware

Please send ( ) data on the new method of application

( ) sources of supply of glass fabric treated with "Volan."

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

Learn How FIBERPLAST

The Superior Phenolic Compound for Compression Molding

GIVES YOU MAXIMUM IMPACT STRENGTH PLUS MAXIMUM FLOW!

There's a Fiberplast material that is "just right" for your molding need! Whatever your problem, our laboratory will develop the exact Fiberplast compound that is specifically designed for your particular application.

Fiberplast combines selective fibers and phenolics to give you a superior molding compound with these outstanding features:

- Lower molding pressures
- Rapid cure
- Lustrous finish
- Choice of colors
- Heat and moisture resistant
- Special functional capabilities

Let our engineering staff tackle your particular molding problem. Write for full information, material specifications, testing data, or samples, if required.

Plastics Division
INTERNATIONAL TEXTILE CO.
2515 W. 18th Street, Chicago 8, Illinois
Cable Address: Inco

serving the PLASTICS INDUSTRY

1. PRECISION COMPRESSION & INJECTION PLASTIC MOLDS

3 WAYS

1. PRECISION Compression & Injection MOLDS
Molds, cavities, and hobs, precision-engineered of finer materials . . . to give better service and last longer!

2. BUTTONDEX KREHBIEL AUTOMATIC DRILLING MACHINE
Drills Buttons and other small Plastic items automatically. Suitable for Casein, Acrylic, Urea, Phenol, Lucite, Acetate, and all types of plastics. Completely motorized units. A NEW BUTTONDEX Product

3. AUTOMATIC BUTTON BROACHER
Punches fins and cleans holes of Urea, Phenol, and Melamine buttons. Production up to 450 per minute

ButtOndeX CORP. 386 Fourth Avenue New York, N. Y.

Your Problem is Our Product

Engineering

(*Continued from p. 87*)

method for delivering an accurately weighed charge of thermoplastic material to an injection chamber at each shot. It was claimed that in order to gain the many advantages of the "starved feed" molding techniques, weigh feeding was required. In MODERN PLASTICS, November, 1952, The Glengarry Equipment Corp., Bay Shore, N. Y., announced the successful introduction of such a unit.

In addition to the articles reviewed in the following pages, complete details on the subjects listed in the next few paragraphs were included in the Engineering Section of MODERN PLASTICS Magazine during 1952.

"Repairing Reinforced Plastics" (February) gave complete information on the materials, methods, and equipment for repairing damaged radomes.

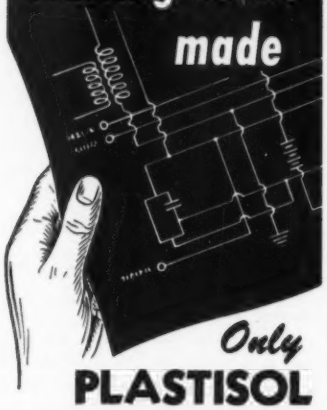
"Rotational Casting of Plastisols" (May) described a new machine built and operated by The Sun Rubber Co., Barberton, Ohio.

"Estimating Mold Prices" (July) outlined a method called "formula estimating" which its originator, Guy P. Harvey and Son Corp., Leominster, Mass., claims will give the accuracy of an actual estimate with the speed of the "guess-work" method.

The mold design and production techniques used by Camfield Manufacturing Co., Grand Huron, Mich., for making two sizes of sleds for the Army Quartermaster Corps were covered in the article "Army Sleds for the Arctic" (April). These sleds, 4 ft. long by 2 ft. wide, and 7 ft. long by 2 ft. wide, are being used to transport loads up to 400 pounds.

"Molding Eliminates Sewing" (December) gave the intimate details of an outstanding development by Briggs Manufacturing Co., Detroit, Mich., which makes it possible to mold-in all design details including chrome plated metal strips on automobile seat cushions and interior side panels. This method has eliminated all sewing, tying on of upholstery, buttons, and mechanical assembly of decorative metal strips on cushions and panels for such cars as the Chrysler, Plymouth, and Packard.—END

ELECTRICAL
For products waiting to be made



Only
PLASTISOL INSULATION
for Molding, Extruding or Dipping can be specifically compounded to produce these advantages:

- Ease of molding or coating—inexpensive molds or equipment required
- Good aging properties under normal operating temperatures
- Low temperature flexibility
- Good outdoor durability
- Resists most acids and alkalis
- Good flame resistance
- Resistance to oil and grease

Whatever you manufacture, from spaghetti wiring to circuit-breaker panels, Stanley chemists can formulate a vinyl plastisol to meet your most exacting insulation requirements. For specific information write *today* to the Stanley Chemical Co., 72 Berlin St., East Berlin, Conn.

STANLEY Industrial Coatings
STANLEY CHEMICAL
LACQUERS JAPANS SYNTHETICS ENAMELS

1952 in Review

(*Continued from pp.* 111-24)

of the Commission on Macromolecules and of the IUPAC Division of Plastics and High Polymers will be held in Stockholm and Uppsala, Sweden, July 29 to August 8, 1953, at which time symposia on lignin, cellulose, and polymer chemistry are scheduled. The British Standards Institution (401) issued new standards for Flexible Unsupported Polyvinyl Chloride Film and Sheeting (B.S. 1763), Rainwear from Polyvinyl Chloride Sheeting (B.S. 1774), and Fabrication of Lightweight Articles from Polyvinyl Chloride Sheeting (B.S. 1776). A proposed British plan for standardizing plastic electrical components was outlined (402).

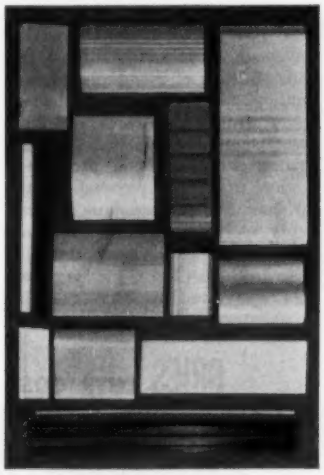
Committee D-20 on Plastics of the American Society for Testing Materials adopted four new methods of test, namely, volatile loss from plastic materials (D1203-52T), changes in linear dimensions of nonrigid thermoplastic sheeting and film (D1204-52T), flow of thermoplastics by extrusion plastometer (D1238-52T), and resistance of plastic films to extraction by chemicals (D1239-52T). The first and fourth methods were prepared in cooperation with the Society of the Plastics Industry as a part of their program on the development of a Commercial Standard for vinyl film. Committee D-20 revised five methods of test, namely, compressive strength (D695-52T), brittleness temperature of plastics and elastomers (D746-52T), diffusion of light (D636-43), luminous reflectance, transmittance, and color of plastics (D791-50), and tensile properties (D638-52T). It adopted three new specifications covering polyester molding compounds (D729-52T), cellulose acetate sheet and film for primary insulation (D1202-52T), and enclosures and servicing units for tests above and below room temperature (D1197-52T), and revised three specifications covering laminated thermosetting materials (D709-52T), vinylidene chloride molding compounds (D729-52T), and ethyl cellulose compounds (D787-52T). New definitions of terms relating to plastics (D883-52T) were also adopted (403).

Committee D-14 on Adhesives

FOR FINE CUSTOM EXTRUSION PRODUCTS...

CONTACT YOUR SHEFFIELD SALES REPRESENTATIVE!

Strips . . . rods . . . tubes . . . custom contours—whatever the design, in virtually all thermoplastic materials—Sheffield Plastics has merited a nation-wide reputation for superior extruded products.



HERE'S WHY . . .

- ★ Efficient design from Sheffield's experienced engineering.
- ★ Extrusion dies and needed special equipment skillfully produced by and at Sheffield.
- ★ Prompt presentation of quotations—no obligation, of course.

Investigate Sheffield! From design to shipment, men and machines geared to answering every industrial extrusion need. Send today for the fact-packed Sheffield brochure.

SHEFFIELD PLASTICS INC.
SHEFFIELD • MASSACHUSETTS

Sales Representatives

Sheffield Plastics, Inc.
One No. LaSalle St.
Chicago, Illinois
Phone: Franklin 2-1557

Mr. James W. Whitfield
6006 Onondago Rd.
Washington, D. C.
Phone: Executive 5640

Mr. Frank J. Burke
Rm. 1031 Commercial Trust Bldg.
Philadelphia 2, Penn.
Phone: Locust 4-0456

Mr. Henry H. Van Cleef
Box 247
Branford, Conn.
Phone: 8-2205

Mr. Ward A. Robinson
473 Washington St.
Wellesley, Mass.
Phone: 5-5111

(404) adopted a revision of the method of test for impact strength of adhesives (D950-52T) and also adopted new definitions of terms which relate to adhesives (D907-52T).

The second meeting of Technical Committee 61 on Plastics of the International Organization for Standardization was held in Turin, Italy, on October 2-4, with G. M. Kline, United States, and M. Muzzoli, Italy, presiding as co-chairmen. Delegations were present from nine countries, namely, Belgium, France, Germany, Italy, Netherlands, Sweden, Switzerland, United Kingdom, and United States. The American delegation consisted of five members: Cooper (Du Pont, leader), Kavanagh (Monsanto), Kline (National Bureau of Standards), Reinsmith (Office of Chief of Ordnance, Department of the Army), and Zinzow (Bakelite). Five working groups dealing with strength properties, thermal properties, physical-chemical methods, conditioning procedures, and nomenclature met and reached tentative agreement on three methods of test, and temperature and humidity conditions for laboratory conditioning. These will be circulated to the members of the working groups for review and, if approved by these groups and ISO/TC 61, they will be sent to letter ballot of the ISO member standards bodies. If they are accepted by a majority of these bodies and the ISO Council, they become ISO recommended testing methods for plastics. If they are later approved by all the member bodies of the International Organization for Standardization, they become International Standard Testing Methods. It is expected that the next meeting of ISO/TC 61 on Plastics will be held in August 1953, and will be possibly arranged in Sweden following the conference of the International Union of Pure and Applied Chemistry.

References

1. "Resources for freedom," by the President's Materials Policy Commission, William S. Paley, Chairman. 5 vols. Washington: Government Printing Office. June 1952.
2. "Past and future growth of the chemical industry," by R. H. Ewell, Chem. Eng. News *29*, 5228-5230, 5312 (Dec. 10, 1951).
3. "British plastics for the world," Brit. Plastics *25*, 314-339 (Oct. 1952).
4. "Petroleum chemicals," by O. V. Tracy, Chem. Eng. News *30*, 4240-4243 (Oct. 13, 1952).
5. "Petrochemicals," by J. F. Bohmfalk, Jr., Chem. Eng. News *30*, 1842-1847 (May 5, 1952).
6. "New sources for coal chemicals," Modern Plastics *29*, 166, 167 (July 1952).

Materials

7. "Acrylics — new methods new markets," Modern Plastics *30*, 81-83, 191 (Sept. 1952).
8. "Effects of biaxial stretchforming," by B. M. Axilrod, M .A. Sherman, V. Cohen, and I. Wolock, Modern Plastics *30*, 117, 118, 120, 122, 124, 182, 184 (Dec. 1952).
9. "Storage room for laminated acrylic," by F. M. Johnson, Modern Plastics *30*, 111, 114 (Dec. 1952).
10. "Evaluation of strippable protective coatings for acrylic plastics," by H. G. Pfeiderer and R. A. Machlowitz, ASTM Bull. No. 178, 59-62 (Dec. 1951).
11. "Canopy protection," Modern Plastics *30*, 175 (Sept. 1952).
12. "Soil conditioning with acrylonitrile," Modern Plastics *29*, 78-80 (Feb. 1952).
13. "Properties of Polymethyl alphachloroacrylate," by M. C. Slone, J. J. Lamb, and F. W. Reinhart, Modern Plastics *29*, 109, 110, 112, 114, 116, 118, 120, 188 (June 1952).
14. "The Hofmann reaction with polymethacrylamide," by C. L. Arcus, J. Polymer Sci. *8*, 365-370 (Apr. 1952).
15. "Effect of velocity on tensile impact properties of polymethyl methacrylate," by B. Maxwell and J. P. Harrington, Trans. ASME *74*, 579-587 May 1952).
16. "Ultrasonic studies of polymethyl Methacrylate," by J. L. Melchor and A. A. Petrauskas, Ind. Eng. Chem. *44*, 716-719 (Apr. 1952).
17. "Translucent films of acrylic acid esters-acrylonitrile copolymers," by F. Leonard, I. Cort, and T. B. Blevins, Ind. Eng. Chem. *43*, 2500-2506 (Nov. 1951).
18. "Hyatt award," Modern Plastics *29*, 79 (July 1952).
19. "Resins as finishing agents," by D. G. Patterson, E. B. Detwiler, and T. J. Suen, Modern Plastics *29*, 151-152, 154, 156, 158, 160, 162, 164, 270, 272, 275 (Mar. 1952).
20. "Applications of aminoplastics to textiles, with special reference to their effect on dying and cleaning practice," by A. R. Smith, Brit. Plastics *24*, 386-389 (Nov. 1951).
21. "Water resistance of coatings countaining nitrogenous resins," by H. Grinsfelder, Ind. Eng. Chem. *44*, 563-568 (Mar. 1952).

(*Continued on* p. 190)

GRIES CUTS COST AND TIME!

TINY INJECTION MOLDED PRECISION PLASTIC PARTS

Completely automatic . . . parts delivered trimmed, ready for use, in one operation, with Gries' speedy, specialized production facilities. NYLON A SPECIALTY.

INDIVIDUAL PARTS
No limit on smallness, intricacy and precision—our unique features.

INDIVIDUAL INSERTS
Automatic insert feed permits wide variety of product possibilities.

CONTINUOUS INSERTS
Small members accurately spaced on tape, cord, wire chain, etc.

Maximum Size: .025 oz.—1¼" long

NO MINIMUM! LOW MOLD COSTS

Write Today for Samples and Bulletin

GRIES REPRODUCER CORP.

E. 133 St. & Willow Ave., New York 54, Tel.: MOtt Haven 5-7400

Good News!

LARGER SIZES

Polyethylene Sheets

Compression molded thermoplastic sheet users now have available larger sizes of Acadia polyethylene. These are available in the new size of 36" x 36" x ½". Standard sizes are furnished in 20" x 20" from ½" to 1" thick and 24" x 24" from ⅛" to ½" thick. Special sizes are also available. Polystyrene, Tenite, Saran, Vinylite, Geon, Ethyl-Cellulose and Styralloy sheets can be compression molded in most of the above sizes.

Wire or write for specifications.

Acadia Synthetic Products Division

WESTERN FELT WORKS

4033-4117 Ogden Ave. • Chicago 23, Ill.

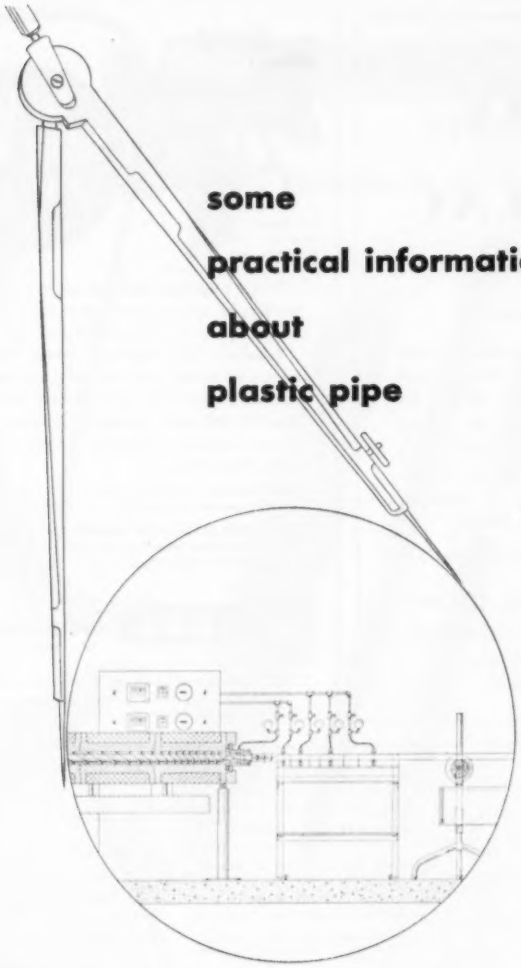
ACADIA

Processors of Synthetic Rubber and Plastics • Sheets Extrusions • Molded Parts

Synthetic PRODUCTS

MANUFACTURERS AND CUTTERS OF WOOL FELTS

some practical information about plastic pipe



• In a plastic process unit you have these basic elements: extrusion; sizing; stress-relieving; cooling; cutting to length; inspection and packaging. In addition, there is also a reclaiming unit for rejected pipe.

Above you see an illustration of the heart of the plastic pipe processing unit . . . extruder with its die, sizing rings and take-off equipment. Herein lies the success or failure of the finished product. .

To make plastic pipe, either rigid or flexible, you start with a choice of basic plastics. Today, there are several accepted basics, such as: modified polystyrene; butyrate; polyethylene and either rigid or semi-rigid polyvinyl chloride. Each of these plastics has specific qualities and individual characteristics. The type you use depends upon the end use to which the finished pipe is to be put.

We have been working with plastics and plastic pipe, and rubber, for many, many years. Our Extruders have produced many miles of plastic pipe. We can give you practical help in setting up either the basic process or the complete plant, designing and building the equipment. Before you undertake your plastic pipe project, consult with the people who know the business.

YOUR INQUIRY — If you want to be in the plastic pipe business, we can help you. A letter of inquiry will receive prompt and confidential attention.

National Erie products for the Plastic and Rubber Industries • Extruders • Simplex Doors for Autoclaves • Mills and Hydraulic Presses.

This old and well-known line of machinery was acquired March 1, 1952, by The Aetna-Standard Engineering Company. They are manufactured in their Warren, Ohio and Ellwood City, Pa., plants. The sales and engineering of the National Erie line is the responsibility of Hale and Kullgren, Inc., Akron, Ohio.

SALES and ENGINEERING by
HALE AND KULLGREN INCORPORATED

MANUFACTURING by
Aetna-Standard
THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.
Plants in Warren, Ohio
Ellwood City, Penna.

color your

STYRENE

with lustrous

REZ-N-LAC

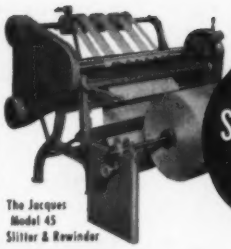
- *Fast-drying*
- *Non-crazing*
- *Excellent adhesion*

Dress up your polystyrene products with colorful REZ-N-LAC enamel. Adhesion? YOU CAN'T SCRATCH IT OFF! Its mild solvents will not craze or soften even thinnest plastics. Non-Toxic, it's ideal for spraying or painting toys. Available in bright transparent or opaque colors, plus clear, white and black.

Write For Descriptive Literature

Schwartz CHEMICAL CO., INC.

328 West 70th Street
New York 23, N. Y.



The Jacques Model 45 Slitter & Rewinder

For Low Cost Slitting & Rewinding

OF PAPER, PLASTICS, FABRICS, LAMINATIONS, ETC.

Here's a machine designed for low cost slitting and rewinding of light materials up to 20/1000" thick. Handles widths up to 45" and parent rolls up to 40" diameter.

Because of its improved design, this Jacques slitter saves you money in initial cost, and in installation and operating expenses. Faster, easier production is made possible by new patented frictions. Available with rotary contact or razor-type cutters (or both) for your individual needs.

FREE FACTORY TEST RUN! Send your material and specifications to our plant for free test run at no obligation.

WRITE FOR DESCRIPTIVE FOLDER! *Get detailed information now!* For trouble-free performance through the years, specify only *genuine* Hobbs replacement parts.

HOBBS MANUFACTURING CO.

25 SALISBURY ST., WORCESTER 5, MASS.

EST. 1887

Producers of Modern Machinery for Modern Industry

Jacques Hand and Power Shears, Slitters and Rewinders, Hobbs Automonic and Tri-Power Die Presses, Paper Box Machinery and Touch-O-Matic Industrial Cutters.

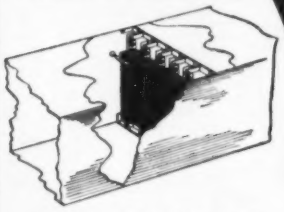
22. "New printing process aids the blind," Plastics (London) *17*, 224-225 (Aug. 1952).
23. "Reaction de condensation de formaldéhyde et duree," by G. Smets and A. Borzes. J. Polymer Sci. *8*, 371-394 (Apr. 1952).
24. "Thin rigid sheets," MODERN PLASTICS *29*, 84-87, 184 (Aug. 1952).
25. "Cellulose acetate film protects print," Plastics (London) *17*, 74 (Mar. 1952).
26. "Continuous extrusion of variegated strip," MODERN PLASTICS *29*, 120-121, 174-175 (Apr. 1952).
27. "Extrusion of acetate sheets and large pipe," by E. C. Blackard, SPE J. *8*, 8-15 (Mar. 1952).
28. "Wine pipe," MODERN PLASTICS *29*, 172 (July 1952).
29. "Butyrate conduit for power lines," MODERN PLASTICS *30*, 94 (Dec. 1952).
30. "Protection of cellulose esters against breakdown by heat and light," by G. C. DeCroes and J. W. Tamblyn, MODERN PLASTICS *29*, 127-128, 130, 132, 134, 136, 185-189 (Apr. 1952).
31. "Basic degree of plymerization of cellulose acetate," by L. A. Cox and O. A. Battista, Ind. Eng. Chem. *44*, 893-896 (Apr. 1952).
32. "Epoxies—no wonder," MODERN PLASTICS 30, 89-94 (Oct. 1952).
33. "Epoxy protects aluminum," MODERN PLASTICS *29*, 160 (Feb. 1952).
34. "Ethoxyline resins," by E. Preiswerk, Plastics (London) *17*, 6-10 (Jan.); 43-46 (Feb. 1952).
35. "Application of some epoxide resins in the plastics industry," by E. S. Narracott, Brit. Plastics *24*, 341-345 (Oct. 1951).
36. "Styrenation of esters of bisphenol-epichlorohydrin condensates," by J. W. McNabb and H. F. Payne, Ind. Eng. Chem. *44*, 2394-2397 (Oct. 1952).
37. "Plastic pipe patches," MODERN PLASTICS *30*, 96 (Oct. 1952).
38. "Production of large polyethylene carboys," by E. Cronio, MODERN PLASTICS *29*, 101-103, 106 (July 1952).
39. "Effect of extruder variables on properties and output of polyethylene film," by W. A. Haine and W. M. Landt, MODERN PLASTICS *29*, 109-110, 112, 116, 118, 120, 196-197 (Feb. 1952).
40. "Hot runner molds," MODERN PLASTICS *29*, 101-103 (June 1952).
41. "O' rings," MODERN PLASTICS *29*, 164 Apr. 1952).
42. "Polyethylene air filter," MODERN PLASTICS *29*, 170 (June 1950).
43. "Polyethylene tow target," MODERN PLASTICS *29*, 174 (July 1952.)
44. "Self-charging siphon in polythene," Brit. Plastics *25*, 115 (Apr. 1952).
45. "Creep test methods for determining cracking sensitivity of polyethylene polymers," by W. C. Ellis and J. D. Cummings, ASTM Bull. No. 178, 47-50 (Dec. 1951).
46. "A curious type of fault in insulated submarine cables," Plastics (London) *17*, 141-142 (May 1952).
47. "Oxidation of general-purpose polyethylene resin," by C. S. Myers, Ind. Eng. Chem. *44*, 1095-1098 (May 1952).
48. "Number-average molecular weight of polythene," by L. Harris, J. Polymer Sci. *8*, 353-364 (Apr. 1952).
49. "Effects of alkathene upon water quality," by E. F. W. Mackenzie, J. Inst. Water Engineers *5*, 596-604 (Oct. 1951).
50. "Fluorocarbons face frram and fortune, MODERN PLASTICS *30*, 79-87, 170-174, 176-178 (Dec. 1952).
51. "Versatile fluorine plastics," Chem. Eng. News *30*, 2688-2691 (June 30, 1952).
52. Teflon terafluoroethylene resin dispersions," by J. F. Lontz and W. B. Happoldt, Jr., In. Eng. Chem. *44*, 1800-1805 (Aug. 1952).
53. "Extrusion properties of lubricated resin from coagulated dispersion," by J. F. Lontz, J. A. Jaffe, L. E. Robb, and W. B. Happoldt, Jr., Ind. Eng. Chem. 44, 1805-1810 (Aug. 1952).
54. "Molding valve holders in PTFE," Brit. Plastics *25*, 268 (Aug. 1952).
55. "Metal-surfaced and other fluorocarbon combinations," by M. A. Rudner, Electrical Mfg. *49*, 106-110, 282, 284, 286, 288 (Mar. 1952).
56. "Non-stick machine parts," Modern Packagink *25*, 116-118 (Apr. 1952).
57. "Calorimetric properties of polyterafluoroethylene (Teflon) from 0° to 365° K," by G. T. Furukawa, R. E. McCoskey, and G. J. King, J. Research (Nat. Bur. Standards *49*, 273-278 (Oct. 1952).
58. "Fluorothene wire insulation," by B. H. Maddock and W. M. Land, MODERN PLASTICS *30*, 126, 128, 130, 186, 188, 190, 192 (Dec. 1952).
59. "Furfural as a resin former," by E. A. Reineck, MODERN PLASTICS *29*, 122, 124, 195, 196, 199, 200 (June 1952).
60. "Furfuryl alcohol as a resin former," by F. A. Reineck, MODERN PLASTICS *30*, 127-132, 195-198 (Oct. 1952).
61. "Cast plastics from 2-furaldehyde," by O. R. Sweeney, L. K. Arnold, and J. T. Long, Ind. Eng. Chem. *44*, 1582-1586 (July 1952).
62. "Why rubber phenolics?" MODERN PLASTICS *29*, 71-77 (Feb. 1952).
63. "Modified phenolics," by W. Goss, SPE J. *8*, 13-15 (Apr. 1952).
64. "Wider design opportunities with the new phenolics," by A. E. Javitz, Electrical Mfg. *49*, 112-117, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362 (June); *50*, 102-107, 264, 266, 268 (July); 92-96, 314, 316, 318, 320, 322 (Aug. 1952).
65. "Nylon-phenolic terminal-board material," by D. L. Matson, MODERN PLASTICS *30*, 137, 138, 140, 212, (Nov. 1952).
66. "Platable phenolic," MODERN PLASTICS *29*, 86 (June 1952).
67. "Molded wings for delta aircraft," Brit. Plastics *24*, 334-337 (Oct. 1951).
68. "Investigations of phenolic resins for making improved wood. I. Preparation and examination of the resins," by L. K. Dalton, J. S. Fitzgerald, and H. H. Hatt, Australian J. Applied Sci. *2*, No. 2, 288-305 (1951).
69. "Resorcinol-formaldehyde reaction," by P. J. Stedry, Ind. Eng. Chem. *43*, 2372-2375 (Oct. 1951).
70. "Precipitation point in phenolic resins and its evaluation," by K. B. Goldblum, Ind. Eng. Chem. *44*, 359-362 (Jan. 1952).
71. "Kinetics of alkaline-catalyzed phenol-formaldehyde reaction. Ammonia: sodium hydroxide," by L. M. Debing, G. E. Murray, and R. J. Schatz, Ind. Eng. Chem. *44*, 354-359 (Jan. 1952).
72. "Purified chemicals and resins from phenol and formaldehyde," by H. L. Bender, A. G. Farnham, J. W. Guyer, F. M. Apel, and T. B. Gibb, Jr., Ind. Eng. Chem. *44*, 1619-1623 (July 1952).
73. "Effect of absorbed water on physical properties of phenolic plastics," by H. M. Quackenbos, Jr. and J. M. Hill, Trans. ASME *74*, 41-50 (Jan. 1952).
74. "Stress gremlins in thermosetting plastics," by H. M. Quackenbos, Jr., SPE J. *8*, 19-21 (Apr. 1952).
75. "Current techniques for the injection molding of nylon," by L. Paggi, MODERN PLASTICS *29*, 101-104, 106, 108, 192 (May 1952).
76. "Extrusion of nylon," MODERN PLASTICS *29*, 99-102, 104, 105, 108, 172 (Aug. 1952).
77. "Nylon parts for ball bearings," by R. W. Recknagel, Product Eng. *23*, 119-123 (Feb. 1952).
78. "Nylon liners," MODERN PLASTICS *29*, 162 (Apr. 1952).
79. "Nylon rims," MODERN PLASTICS *30*, 170 (Sept 1952).
80. "Nylon gears lower cost," MODERN PLASTICS *29*, 171 (July 1952).
81. "Molded nylon improves dishwasher," MODERN PLASTICS *29*, 100-101 (Apr. 1952).
82. "Amide interchange reactions," by L. F. Beste and R. C. Houtz, J. Polymer Sci. *8*, 395-

CHROMALOX
STRIP HEATERS
solve hundreds of heating problems

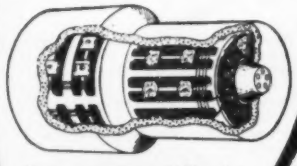
In straight lengths, curves, rings, segments and with fins. 4½" to 95" lengths; ¾" to 2½" width. Iron, steel and alloy sheaths.

efficient · dependable · low cost
electric
heat for Processes and products

TYPICAL APPLICATIONS



Chromalox Electric Fin-Strip Heaters mounted in air ducts.



Plastic extrusion barrel with Chromalox Ring, Straight and Curved Strip Heaters.

10-90

CHROMALOX Electric Strip Heaters give clean, dependable and accurately controlled heat. They are widely used in platens, dies, kettles, tanks, ovens, air ducts and other applications requiring accurate temperature control and around-the-clock service.

If you are a user of heat, either in processes or products, you can get many valuable application ideas by sending for the booklet below. On-the-job engineering assistance, without obligation.

CHROMALOX
Electric Heat for Modern Industry

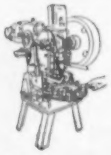
WANT MORE FACTS?
Send for this booklet of application ideas you can adapt for use in your plant. Write for your free copy today.

EDWIN L. WIEGAND COMPANY. 7503 THOMAS BLVD. · PITTSBURGH 8, PA.

307 (Apr. 1952).
83. "Heat-resistant copolymer of triallyl cyanurate and a maleic alkyd," by P. M. Elliott, MODERN PLASTICS *29*, 113, 114, 185-187 (July 1952).
84. "Polyester resins for strength retention at 500° F.," by H. M. Day and D. G. Patterson, MODERN PLASTICS *29*, 116, 120, 122 (July 1952).
85. "An alkyd with muscles," MODERN PLASTICS *29*, 84-85 (Feb. 1952).
86. "New polyester glass compounds," MODERN PLASTICS *29*, 94 (Apr. 1952).
87. "Glass-reinforced alkyd plastics," by M. H. Bigelow and P. E. Nowicki, Electrical Mfg. *49*, 110-113, 312 (Apr. 1952).
88. "Exotherm curves for cold-setting polyester resins," by F. S. Nichols and C. H. Bliss, MODERN PLASTICS *29*, 124, 194, 197, 199, 200, 203, 204 (May 1952).
89. "Isophthalic acid. Application in condensation polymers," by F. G. Lum and E. F. Carlston, Ind. Eng. Chem. *44*, 1595-1600 (July 1952).
90. "The future for Mylar," MODERN PLASTICS *30*, 226, 228 (Nov. 1952).
91. "What silicones can do," MODERN PLASTICS *30*, 73-80, 184, 187-190 (Sept. 1952).
92. "Silicone-glass for low pressure," MODERN PLASTICS *29*, 106, 181, 182 (Apr. 1952).
93. "Low-pressure lamination of silicone resins," by K. R. Hoffman, MODERN PLASTICS *30*, 146, 148, 219, 220, 223-225 (Nov. 1952).
94. "Low temperature behavior of silicone and organic rubbers," by K. E. Polmanteer, P. E. Servais and G. M. Konkle, Ind. Eng. Chem. *44*, 1570-1581 (July 1952).
95. "Silicone rubber for mechanical components," by A. E. Javitz, Electrical Mfg. *50*, 142-147, 314, 316, 318 (Nov. 1952).
96. "Printed circuit techniques: an adhesive tape-resistor system," by B. L. Davis, Nat. Bur. Standards Circular 530, 83 pp. (Feb. 29, 1952).
97. "Polymer chemistry of the linear siloxanes," by E. L. Warrick, M. J. Hunter, and A. J. Barry, Ind. Eng. Chem. *44*, 2196-2201 (Sept. 1952).
98. "Here come the copolymers," MODERN PLASTICS *29*, 71-78, 183 (July 1952).
99. "New strength for styrene," MODERN PLASTICS *30*, 91-98 (Nov. 1952).
100. "The biggest yet," MODERN PLASTICS *29*, 107-109 (Apr. 1952).
101. "Power packs for flash photography," MODERN PLASTICS *30*, 114, 115, 204 (Nov. 1952).
102. "Picnic plates vacuum formed," MODERN PLASTICS *29*, 92, 93 (Aug. 1952).
103. "High impact styrene and copolymers," by P. M. Elliot, SPE J. *8*, 15-17 (Feb. 1952).
104. "Battery case weighs 8½ pounds," MODERN PLASTICS *29*, 90, 91 (Aug. 1952).
105. "Coloring of polystyrene molding material," by S. D. Eagleton and H. B. Kingsley, Brit. Plastics *25*, 120-125 (Apr. 1952).
106. "Effect of orientation on thhe mechanical and A. G. H. Dietz, Trans. ASME *74*, 31-40 properties of polystyrene," by R. G. Cheatham (Jan. 1952).
107. "Creep relaxation relations for styrene and acrylic plastics," by J. Marin and Y. Pao, Proc. ASTM *51*, 1277-1295 (1951).
108. "Heat distortion of polystyrene," by K. J. Cleereman, H. J. Karam, and J. L.Williams, ASTM Bull. No. 180, 37-44 (Feb. 1952).
109. "Films derived from styrene-maleic anhydride and styrene-monoethyl maleate heteropolymers," by R. G. Heligmann and E. E. McSweeney, Ind. Eng. Chem. *44*, 113-116 (Jan. 1952).
110. "A look at the vinyls," Modern Packaging *25*, 79-85 (Feb. 1952).
111. "Rodent-resistant vinyl films," by J. F. Welch and E. W. Duggan, Modern Packaging *25*, 130-131, 182, 183 (Feb. 1952).
112. "Multi-way PVC tubes for gases and liquids," Plastics (London) *17*, 121 (May 1952).
113. "PVC delivers the goods," Brit. Plastics *24*, 407-411 (Dec. 1951).
114. "PVC cinema screens," Brit. Plastics *25*, 38-39 (Feb. 1952).
116. "Vinyl for outdoor protection," MODERN PLASTICS *29*, 95 (July 1952).
116. "Pedestrian crossing in PVC," Brit. Plastics *24*, 428 (Dec. 1951).
117. "Vinyl strip seals concrete," MODERN PLASTICS *29*, 79, 186 (June 1952).
118. "PVC material in boot and shoe manufacture," Brit. Plastics *25*, 106-111 (Apr. 1952).
119. "PVC wiring in telephone exchange equipment," Brit. Plastics *25*, 222-216 (July 1952).
120. "PVC extrusions for industry," Brit. Plastics *25*, 74-80 (Mar. 1952).
121. "Getting the best from plastisols," MODERN PLASTICS *30*, 116-118 (Nov. 1952).
122. "Progress in dip-molding with PVC paste," Plastics (London) *17*, 117-120 (May 1952).
123. "Rotational casting of plastisols," MODERN PLASTICS *29*, 109 (May 1952).
124. "And now the 'plastigels'" by R. W. Quarles, E. T. Severs, A. C. Frechtling, and H. S. Carpenter, MODERN PLASTICS *29*, 99-101 (Jan. 1952).
125. "The hard vinyls," MODERN PLASTICS *29*, 87-93 (Apr. 1952).
126. "Extrusion of vinyl film," by A. M. Stover, SPE J *8*, 13, 14, 24 (Feb. 1952).
127. "Vinyl plasticizer developments," by R. G. Kadesch, MODERN PLASTICS *29*, 111, 112, 114, 118, 178, 180-182 (Aug. 1952).
128. "Chlorinated polyphenyls and their applications in PVC compositions and in surface coatings," Brit. Plastics *24*, 390-392 (Nov. 1951).
129. "Latices of flexible synthetic polymers," by B. M. G. Zwicker, Ind. Eng. Chem. *44*, 774-786 (Apr. 1952).
130. "Some aspects of the motion of chain segments in plasticized polyvinyl chloride. II. Tensile creep of plasticized polyvinyl chloride," by A. Dyson, J. Polymer Sci. *7*, 147-158 (Aug., Sept. 1951).
131. "Effect of temperature and composition upon the resilience of elastomers," by E. F. Schulz, MODERN PLASTICS *29*, 120, 122, 124, 185 (Aug. 1952).
132. "Role of hydrogen chloride in PVC degradation," by A. L. Scarbrough, W. L. Kellner, and P. W. Rizzo, MODERN PLASTICS *29*, 111, 112, 114, 116, 118, 120, 122 (May 1952).
133. "Saran spreads out," MODERN PLASTICS *30*, 93 (Sept. 1952).
134. "Jacquard weaves in saran," MODERN PLASTICS *29*, 84, 85 (July 1952).
135. "Vinylidene insoles for Korean boots," Brit. Plastics *25*, 82-85 (Mar. 1952).
136. "Better plastics sponges," MODERN PLASTICS *29*, 169 (July 1952).
137. "Properties of exposed and unexposed polyvinyl butyral coated fabrics," by M. I. Landsberg, T. J. DiFilippo, and L. Boor, Proc. ASTM *51*, 1262-1276 (1951).
138. "Molecular weight degradation of polyvinyl acetate on hydrolysis," by O. L. Wheeler, S. L. Ernst, and R. N. Crozier, J. Polymer Sci. *8*, 409-423 (Apr. 1952).
139. "Relation of composition of polvinyl acetates to thheir physical properties. I. Acetals of saturated aliphatic aldehydes," by A. F. Fitzhigh and R. N. Crozier, J. Polymer Sci. *8*, 225-241 (Feb. 1952).
140. "Polyvinyl acetate emulsions," by A. E. Lever, Plastics (London) *17*, 109 (July 1952).
141. "Solubility and fractionation of polyvinylpyrrolidone," by B. Jirgensons, J. Polymer Sci. *8*, 519-527 (Ma 1952).
142. "Copolymeres greffes," by G. Smets and M. Clasen, J. Polymer Sci. *8*, 289-311 (Mar. 1952).
143. "New vinyl copolymer sheet," Plastics (London) *17*, 61-63 (Mar. 1952).
144. "Vinyl-type polymers containing phosphorus," by C. S. Marvel and J. C. Wright, J. Polymer Sci. *8*, 495-502 (May 1952).
145. "Asphalt, a colloidal material," by R. N.

ACROMARK
MEANS "ACCURATE MARKING"

MARK PLASTICS
BY THE PROCESS THAT SUITS THE JOB



ABOVE IS THE ACROMARK MODEL 9AH HOT STAMPING MACHINE WHICH ALSO COMES IN MOTOR DRIVEN AND AIR DRIVEN MODELS.

This is — The ACROMARK Model 2AH Power Press Hot Stamping Outfit.

The ACROMARK Company
5-15 Morrell St.
Elizabeth 4, New Jersey

Here's Why SANTA CLAUS has BRIGHTER GLOSS!

ONE IMPORTANT REASON is that *New England* lacquers are the coatings used to finish this popular Christmas toy!

Rosbro Plastics Corporation of Providence, R. I., maker of this fast-selling "Galloping Santa", has this to say about New England lacquers: "Results with these lacquers are very satisfactory. We are able to obtain excellent mileage, good coverage, adhesion and surface gloss."

Why not consider using this improved lacquer on your polystyrene products?

Write for free booklet "New England Lacquer for Molded Polystyrene"

NEW ENGLAND LACQUER COMPANY
102 KING PHILIP ROAD, EAST PROVIDENCE, R. I.

HIGH IMPACT — The high glass-to-resin ratio gives Pre-Imp from 8 to 10 times the impact strength of normal molding compounds. Ideal for use in cases, covers and cabinets that take a beating.

dryply

PRE-IMP

glass fiber reinforced polyester

MOLDING COMPOUND

has everything!

Easily molded on standard compression and transfer molding presses

WATER RESISTANCE to a degree that makes Pre-Imp virtually corrosion proof. Replaces metal in articles where rust is a factor. A natural for boat appliances.

CHEMICAL RESISTANCE to most acids, alkalis and other chemicals that eventually destroy metal parts and installations. Good for chemical pipe fittings, battery cases and various types of utensils that may be in contact with chemicals.

APPEARANCE, TOO! In colors with a distinctive glass fiber pattern showing faintly on the surface.

Flexfirm PRODUCTS

Take it up with

LOR-EL

Fine Injection Molding

presses from 4 to 16 ounces

Mold Building

product engineering and mold design

Fabricating

stamping, assembling, experimental and development work

For preferred workmanship, delivery and prices, call . . .

LOR-EL COMPANY

252 Paterson Plank Road Jersey City 7, N. J.

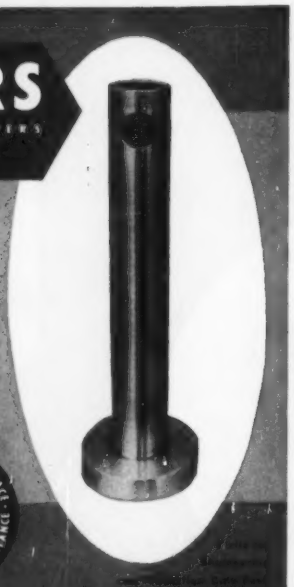
Phone: JOurnal Square 2-4066

EXTRUDERS

FIND XALOY-LINED CYLINDERS

HARD TO BEAT!

- Xaloy liners can be adapted to any extruding equipment.
- Xaloy liners have absolute uniform surfaces, depth hardness.
- Xaloy minimizes contamination.
- Xaloy liners give longer service.



A FERROUS ALLOY SURFACE OF EXCEPTIONAL WEAR RESISTANCE — Xaloy

A NON-FERROUS ALLOY SURFACE OF EXCEPTIONAL CORROSION RESISTANCE — Xaloy 306

INCREASE YOUR PRODUCTION! DECREASE YOUR COSTS!

• SPECIFY XALOY LINERS TO YOUR SUPPLIERS •

Traxler and J. W. Romberg, Ind. Eng. Chem. *44*, 155-158 (Jan. 1952).

146. "Solubility of polyindene in paraffinhydrocarbons," by P. O. Powers, Ind. Eng. Chem. *44*, 380-382 (Feb. 1952).

147. "Chlorinated rubber from latex," by G. J. van Amerongen, Ind. Eng. Chem. *43*, 2535 (Nov. 1951).

148. "What you should know about hard rubber," by A. J. Lorena, Product Eng. *23*, 169-172 (Feb. 1952).

149. "Natural and synthetic rubbers," by N. Bekkedahl, Analytical Chem. *24*, 279-293 (Feb. 1952).

150. "Elastomers," H. L. Fisher, Ind. Eng. Chem. *44*, 2309-2317 (Oct. 1952).

151. "Lignin-reinforced nitrile, neoprene, and natural rubbers," by J. J. Keilen, W. K. Dougherty, and W. R. Cook, Ind. Eng. Chem. *44*, 163-167 (Jan. 1952).

152. "Highly cross-linked polybutadiene," by J. A. Coffman, Ind. Eng. Chem. *44*, 1421-1428 (June 1952).

153. "Copolymerization characteristics of fumaronitrile," by C. C. Price and R. D. Gilbert, J. Polymer Sci. *8*, 577-581 (June 1952).

154. "Catalytic conversion of a diene into deeply colored polymers," by B. Eisler, S. D. Farnsworth, E. Kendrick, R. Schnurmann, and A. Wassermann, J. Polymer Sci. *8*, 157-161 (Feb. 1952).

155. "Absolute propagation rates in emulsion polymerization. III. Styrene and isoprene," by M. Morton, P. P. Salatiello, and H. Landfield, J. Polymer Sci. *8*, 279-287 (Mar. 1952).

156. "Absolute propagation rates in emulsion polymerization. II. Butadiene in hydroperoxide-polyamine systems," by M. Morton, P. P. Salatiello, and H. Landfield, J. Polymer Sci. *8*, 215-224 (Feb. 1952).

157. "Some butadiene copolymers," by C. S. Marvel, T. R. Fukuto, J. W. Berry, W. K. Taft, and B. G. Labbe, J. Polymer Sci. *8*, 599-605 (June 1952).

158. "Polymerization of 2,3-difluorobutadiene and 2-chloro-3-fluorobutadiene," by L. B. Wakefield, Ind. Eng. Chem. *43*, 2363-2366 (Oct. 1951).

159. "Polyalkylene sulfides. X. The reaction of hexamethylenedithiol with 1,3-butadiene," by C. S. Marvel and H. M. Cripps, J. Polymer Sci. *8*, 313-319 (Mar. 1952).

160. "Study of the mechanism of ionic polymerization using radio-active tracers," by R. O. Colclough, J. Polymer Sci. *8*, 467-475 (May 1952).

161. "Rates of initiation in vinyl polymerization," by B. Baysal and A. V. Tobolsky, J. Polymer Sci. *8*, 529-541 (May 1952).

162. "Reactivity ratios of some monomer pairs," by H. C. Haas and M. S. Simon, J. Polymer Sci. *9*, 309-314 (Oct. 1952).

163. "A new tool for determination of the stage of polymerization of thermosetting polymers," by G. A. Sofer and E. A. Hauser, J. Polymer Sci. *8*, 611-620 (June 1952).

164. "Preparation of cation exchange resins of high physical stability," by R. M. Wheaton and D. F. Harrington, Ind. Eng. Chem. *44*, 1796-1800 (Aug. 1952).

165. "Ion exchange resins in sugar cane juice processing," by J. H. Payne, H. P. Kortschak, and R. F. Gill Jr., Ind. Eng. Chem. *44*, 1411-1421 (June 1952).

166. "Catalysis by anion exchange resins," by C. J. Schmidle and R. C. Mansfield, Ind. Eng. Chem. *44*, 1388-1390 (June 1952).

167. "Preparation of standard sodium hydroxide solutions by use of a strong anion exchange resin," by J. Steinbach and H. Freiser, Analytical Chem. *24*, 1027-1029 (June 1952).

168. "Styrene foam in radio relay," Modern Plastics *29*, 86 (July 1952).

169. "Foam insulated container," Modern Plastics *29*, 162 (June 1952).

170. "Shipped in phenolic foam," Modern Plastics *29*, 83 (Aug. 1952).

171. "Hot food for fighters," Modern Plastics *30*, 87, 88 (Sept. 1952).

172. "New vinyl foaming agent," Modern Plastics *29*, 87-89 (Feb. 1952).

173. "Sulfonyl hydrazide blowing agents for rubber and plastics," by B. A. Hunter and D. L. Schoene, Ind. Eng. Chem. *44*, 119-122 (Jan. 1952).

174. "Foamed vinyl from open molds," Modern Plastics *29*, 83 (May 1952).

175. "GR-S latices in foam rubber," by I. Talalay and A. Talalay, Ind. Eng. Chem. *44*, 791-795 (Apr. 1952).

176. "Expanded plastics in the tropics," Brit. Plastics *25*, 165 (May 1952).

177. "Thermoplastic honeycombs," by G. May, Plastics (London) *16*, 305-307 (Nov. 1951).

178. "Compound curved honeycomb core material for sandwich panel construction," by A. H. Herbst, SPE J. *8*, 13-14, *22* (Jan. 1952).

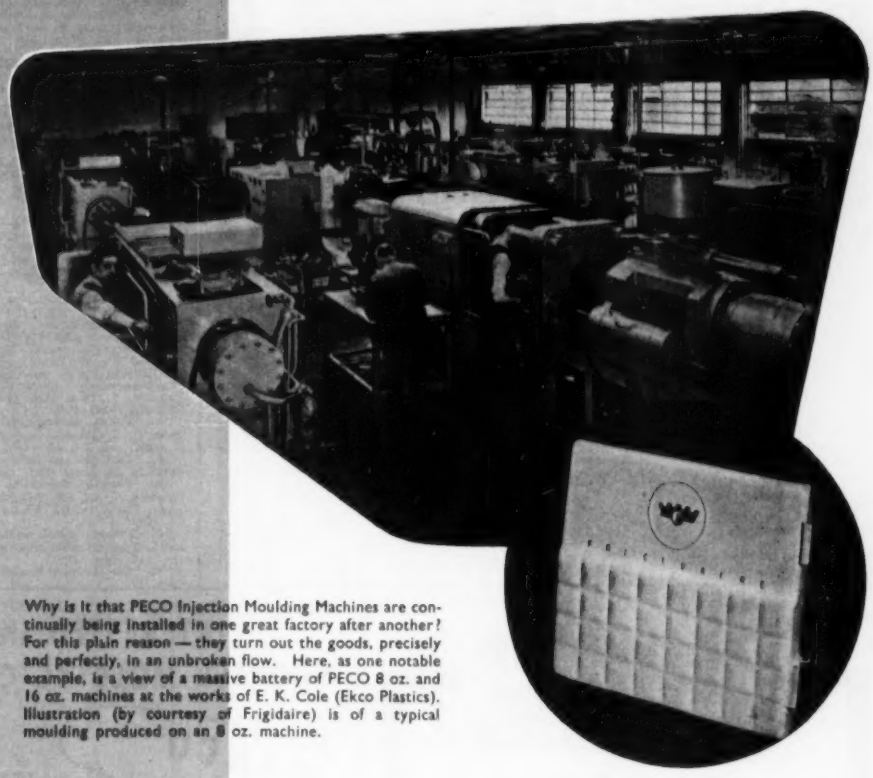
179. "Building with honeycomb plastics," by G. May, Plastics (London) *17*, 92-94, 91 (Apr. 1952).

180. "Plastics and the honeycomb structure," by G. May, Brit. Plastics *25*, 201-205 (June 1952).

181. "Repairing reinforced plastics," by S. S. Olensky, Modern Plastics *29*, 99-100, 102, 104-106 (Feb. 1952).

182. "Properties of honeycomb cores as affected by fiber type, fiber orientation, resin type, and amount," by R. J. Seidl, D. J. Fahye, and

And Why is It Happening?



Why is it that PECO Injection Moulding Machines are continually being installed in one great factory after another? For this plain reason — they turn out the goods, precisely and perfectly, in an unbroken flow. Here, as one notable example, is a view of a massive battery of PECO 8 oz. and 16 oz. machines at the works of E. K. Cole (Ekco Plastics). Illustration (by courtesy of Frigidaire) is of a typical moulding produced on an 8 oz. machine.

MOULDS

PECO MOULDS. Expert designers and mould makers are employed and moulds can be supplied to samples submitted, including die-sinking models if required. An important side of the Company's work is the hobbing of cavities for moulds and medallions — the plant includes a 3,000 ton hobbing plant. Master hobs to customers' samples made as required.

PECO PRODUCTS

PECO Injection Moulding Machines are supplied in 2, 4, 8 and 16 oz. capacities. They are self-contained with automatic cycle and are hydraulically operated. They have a high plasticising capacity and rate of injection. Mould-locking pressure and platen area enable them to operate at a high rate of production.

Full particulars of the PECO range of injection moulding machines and moulds will be sent on request.

The PROJECTILE & ENGINEERING COMPANY LTD.

ACRE STREET, BATTERSEA, LONDON, S.W.8

Telephone: Macaulay 1212. Telegrams: "Profectus, Claproad, London". Cables: Profectus, London

A. W. Voss, Nat. Advisory Com. Aero. Tech. Note No. 2564 (Nov. 1951).
183. "Effect of defects on strength of aircraft type sandwich panels," by A. A. Mohaupt and B. G. Heebink, Forest Prod. Lab. Rep. No. D1809-A (Nov. 1951).
184. "Effect of elevated temperatures on the strengths of small specimens of sandwich construction of the aircraft type," by E. W. Kuenzi, Forest Prod. Lab. Rep. No. 1804-A (Apr. 1952).
185. "Fatigue of sandwich constructions for aircraft," by F. Werren, Forest Prod. Lab. Rep. No. 1859-J (Apr. 1952).
186. "Plastic car body in production," Modern Plastics *29*, 96-99 (Apr. 1952).
187. "Tanks for the desert," Modern Plastics *29*, 76-78 (June 1952).
188. "Alert shelter for jet planes," Modern Plastics *29*, 80, 81 (July 1952).
189. "Mortar pans," Modern Plastics *29*, 176 (July 1952).
190. "Continuous production of polyester pipe," Modern Plastics *29*, 95-98, 100 (June 1952).
191. "Army sleds for the Arctic," by C. E. Holmes, Modern Plastics *29*, 115-118 (Apr. 1952).
192. "Reinforced plastics in revolutionary loud speaker," Modern Plastics *30*, 96 (Dec. 1952).
193. "Low-pressure laminates for aircraft," Brit. Plastics *24*, 415-420 (Dec. 1951).
194. "Heavens on earth," Modern Plastics *30*, 166 (Dec. 1952).
195. "Vinyl silane size for glass fabric," by J. Bjorksten and L. L. Yeager, Modern Plastics *29*, 124, 188 (July 1952).
196. "Vinyl silicone resin treatment of glass fibers," by M. H. Jellinek, Modern Plastics *30*, 150, 154 (Nov. 1952).
197. "Volan (114) finish," by J. V. P. Torrey, Modern Plastics *30*, 154 (Nov. 1952).
198. "Evaluation of finishes for glass fibers," by G. A. Clark, Modern Plastics *30*, 142, 144, 218, 219 (Nov. 1952).
199. "Finish 136 for high wet-strength laminates," by C. E. Bacon, Modern Plastics *29*, 126 (July 1952).
200. "High temperature properties of Stypol 16B-glass cloth laminates," by F. G. Singleton, Modern Plastics *30*, 152 (Nov. 1952).
201. "Fatigue tests of glass-fabric-base laminates subjected to axial loading," by K. H. Boller, Forest Prod. Lab. Rep. No. 1823, 12pp. (May 1952).
202. "Effect of different catalysts and amounts of styrene monomer on strength and durability of glass-cloth plastic laminates," by A. A. Monhaupt and A. D. Fread, Forest Prod. Lab. Rep. No. 1825, 21 pp. (May 1952).
203. "Resins extend the forests," by R. D. Behm, Modern Plastics *30*, 100-104, 191-192 (Oct. 1952).
204. "Plywood is engineered wood," by T. D. Perry, Mech. Eng. *74*, 787-796 (Oct. 1952).
205. "Better plywood surfaces," Modern Plastics *29*, 82, 83 (July 1952).
206. "Influence of resin composition on the properties and structure of improved wood," by H. E. Dadswell, J. S. Fitzgerald, and B. Tamblyn, Australian J. Applied Sci. *3*, No. 1, 71-87 (1952).
207. "Plasticizers set new records," by H. Avery, Modern Plastics *30*, 84-86, 196, 198-200 (Sept. 1952).
208. "Citric acid ester plasticizers," by F. J. Prescott and G. O. Cragwell, Modern Plastics *30*, 134-138, 200-201 (Oct. 1952).
209. "Plasticizers from lactic esters and dibasic acids," by C. E. Rehberg, T. J. Dietz, P. E. Meiss, and M. B. Dixon, Ind. Eng. Chem. *44*, 2191-2195 (Sept. 1952).
210. "Sebacic acid for the plastics industry," Plastics (London) *17*, 64-65 (Mar. 1952).
211. "Plasticizer quality test," by C. J. Malm, L. B. Genung, and M. L. Townsend, Analytical Chem. *23*, 1692-1694 (Nov. 1951).
212. "Extraction and determination of plasticizers from cellulose acetate plastics," by G. S. Whitnack and E. S. Gantz, Analytical Chem. *24*, 1060-1061 (June 1952).
213. "Some observations on the darkening of commercial tricresyl phosphate," by E. H. Searle and L. G. Whitlock, Brit. Plastics *25*, 235-237 (July 1952).
214. "Pigment colors for plasticized vinyl chloride polymers," by G. Wormald and W. F. Spengeman, Ind. Eng. Chem. *44*, 1104-1107 (May 1952).

Processing

215. "Preplasticizing and injection machines," by M. Freund, Brit. Plastics *25*, 126-128 (Apr. 1952).
216. "Preplasticizing," by R. W. Powell, SPE J. *8*, 11-16 (May 1952).
217. "Four preplasticizers in one," Modern Plastics *29*, 106, 107 (June 1952).
218. "Weigh feeding," Modern Plastics *30*, 132 (Nov. 1952).
219. "Molding of heavy sections," by G. Thayer, SPE J. *8*, 5-11 (Apr. 1952).
220. "Measurement of heating capacities of injection molding machines," by C. E. Beyer and R. B. Dahl, Modern Plastics *30*, 124, 126, 130, 204 (Sept. 1952).
221. "A proposal for establishing certified Injection molding machine specifications," by D. J. Sloane, SPE J. *8*, 7-9, 10, (Jan. 1952).
222. "A new machine for large polythene moldings," Brit. Plastics *25*, 10-13 (Jan. 1592).
223. "New pipe extrusion equipment," Modern Plastics *30*, 124, 194 (Oct. 1952).
224. "Flow of plastics materials in pipes," by B. O. A. Hedstrom, Ind. Eng. Chem. *44*, 651-656 (Mar. 1952).
225. "Platen heating by mains frequency induction," Brit. Plastics *25*, 208-209 (June 1952).
226. "Electrostatic ignitibility of dust clouds and powders," by A. R. Boyle and F. J. Llewellyn, J. Soc. Chem. Ind. *69*, 173-181 (June 1950).
227. "Drum extension," Modern Plastics *29*, 178 (June 1952).
228. "Estimating mold prices," by W. G. Harvey, Modern Plastics *29*, 108, 110-111 (July 1952).
229. "Computation and accounting for plastics machinery," by S. H. Withey, Brit. Plastics *25*, 26-30 (Jan. 1952).
230. "New applications and designs for plastics," SPE J. *8*, 16-18 (Apr. 1952).
231. "Four ways of building plastic boats," by J. B. Alfers, Modern Plastics *30*, 102-106 (Nov. 1952).
232. "Ship and plane testing models," Modern Plastics *30*, 125, 126, 128, 130 (Nov. 1952).
233. "Reinforcing reinforced plastics," by E. F. Bushman, Modern Plastics *30*, 98-99 (Dec. 1952).
234. "Automatic machining of laminates," Modern Plastics *30*, 119, 122-123 (Oct. 1952).
235. "Fabrication of decorative laminates," Brit. Plastics *25*, 90-95 (Mar. 1952).
236. "Hermetic seals," by R. O. McIntosh, Electrical Mfg. *49*, 120-123, 328, 332 (Apr. 1952).
237. "Selecting an embedment system for electronic components," by D. G. Heitert and H. W. Niemann, Electrical Mfg. *49*, 113-117, 322, 324, 326, 328 (May 1952).
238. "Potted electronic circuit," by E. N. Shaw, H. G. Manfield, and K. Atkinson, Plastics (London) *16*, 336-337 (Dec. 1951).
239. "Cast phenolic die for forming," Modern Plastics *30*, 97-99 (Oct. 1952).
240. "Phenolic duplicating masters," Modern Plastics *30*, 98, 99 (Sept. 1952).
241. "Vinyl molds," Modern Plastics *30*, 176, 177 (Sept. 1952).
242. "Sprayed metal molds," by W. Brenner and L. Hase, Modern Plastics *30*, 105-109, 112, 114, 116 (Sept. 1952).
243. "Use of air-gap insulation in plastic molds,"

Shawnee
DRY COLORS
COLORS FOR PLASTICS
•
Red & Yellow
Cadmium Toners
•
Strontium Chromate Yellow
•
Ming (Molybdate) Orange
•
Organic Reds, Maroons
Phthalocyanine
Blue & Green Toners
•
Offerings based on extensive experience with leading plastics manufacturers
KENTUCKY COLOR & CHEMICAL CO.
Incorporated
General Office and Works: Louisville, Ky.
Branches and Representatives in Principal Cities

INTERESTED IN SHORTER MOLDING CYCLES?
MANCO
TRU-CAST
BERYLLIUM COPPER CAVITIES AND CORES

INCREASE PRODUCTION . . .
High thermal conductivity promotes rapid dissipation of heat — shortens molding cycles.
Accurate castings up to 175 pounds — cores up to 16 inches wide — any quantity shipped within one week.

Write, wire or phone for new brochure.
MANCO PRODUCTS,
2403 Schaefer Rd. Melvindale, Mich.
Telephone — Detroit: WArwick 8-7411

by W. Kosobud, SPE J. *8*, 11-12 (Jan. 1952).
244. "Molding eliminates sewing," Modern Plastics *30*, 105-108, 110 (Dec. 1952).
245. "High vacuum metallizing," by A. H. Hartman, Modern Plastics *30*, 115-118 (Oct. 1952).
246. "Molded plastics plus precious metals," by J. B. Loeffler, Modern Plastics *30*, 92-93 (Dec. 1952).
247. "Vacuum metallizing as a design tool," by J. G. Seiter, Electrical Mfg. *50*, 148, 149, 334, 336 (Nov. 1952).
248. "Silvering of plastics," by D. McPherson, Brit. Plastics *24*, 383-384 (Nov. 1951).
249. "Plastics versus zinc die-casting," Plastics (London) *17*, 219-221 (Aug. 1952).
250. "Cool grinding," by H. Pottle, Modern Plastics *29*, 107 (Feb. 1952).
251. "Developments in the barrel-polishing of plastics," Brit. Plastics *25*, 24-25 (Jan. 1952).
252. "Cementing thermoplastic moldings," by V. Stannett and D. W. Jay, Plastics (London) *16*, 281-283 (Oct.); 310-311 (Nov.); 348-350 (Dec. 1951).
253. "Electrostatic flocking of plastic surfaces," by E. Escales, Kunststoffe *42*, 61-64 (Aug. 1952).
254. "Parts washer," Modern Plastics *29*, 152 (Aug. 1952).
255. "Anti-static applicator," Modern Plastics *29*, 172 (May 1952).
256. "Quality control," by L. M. Debing, SPE J. *8*, 7-10 (May 1952).
257. "High-speed calender," Modern Plastics *29*, 153 (Aug. 1952).
258 "Photo-decorating plastics," Modern Plastics *30*, 108-109 (Oct. 1952).
259. "New printing and coating technique for rigid sheet," Brit. Plastics *25*, 142-145 (May 1952).
260. "Finishing machine does five jobs," Modern Plastics *30*, 133, 134 (Nov. 1952).
261. "Pilot setup for vacuum forming," Modern Plastics *30*, 95 (Dec. 1952).
262. "Electric control of air-flow porosity in plastic sheet material," by J. J. Suran, Trans. ASME *74*, 23-29 (Jan. 1952).
263. "New frontiers for PVC welding," Brit. Plastics *25*, 250-256 (Aug. 1952).

Applications

264. "Selection of fiber monomers," by W. W. Heckert, Ind. Eng. Chem. *44*, 2103-2109 (Sept. 1952).
265. "Influence of molecular structure on properties," by H. Mark, Ind. Eng. Chem. *44*, 2110-2114 (Sept. 1952).
266. "Tensile properties of newer fibers," by J. H. Dillon, Ind. Eng. Chem. *44*, 2115-2124 (Sept. 1952).
267. "Fiber-fabric relationships," by R. Bouvet, Ind. Eng. Chem. *44*, 2125-2128 (Sept. 1952).
268. "Industrial applications of fibers," by H. S. Grew, Jr., Ind. Eng. Chem. *44*, 2140-2144 (Sept. 1952).
269. "Acetate," by A. M. Tenney, Ind. Eng. Chem. *44*, 2171-2175 (Sept. 1952).
270. "Functional properties of synthetics," by J. B. Quig and R. W. Dennison, Ind. Eng. Chem. *44*, 2176-2186 (Sept. 1952).
271. "Problems accompanying the introduction of the newer synthetic fibers," by J. H. Dillon, ASTM Bull. No. 184, 56-61 (Sept. 1952).
272. "Fibers," by C. S. Grove, Jr., J. L. Votonik, and R. S. Casey, Ind. Eng. Chem. *44*, 2318-2324, 2371-2375 (Oct. 1952).
273. "Plastics-bonded carpets," by G. May, Plastics (London) *17*, 174-177 (June 1952).
274. "Progress report on plastics pipes," Modern Plastics *29*, 75-82 (May 1952).
275. "Trends in industrial piping," by W. H. Shearon, Jr., Chem Eng. News *30*, 316-321 (Jan. 28, 1952).
276. "Protection for sewer pipes," Modern Plastics *29*, 102-103 (Jan. 1952).
277. "Plastics," by G. M. Kline and R. B. Seymour, Ind. Eng. Chem. *44*, 2339-2343 (Oct. 1952).
278. "Plants of plastic," Chem. Week *69*, 37-38, 40, 42 (Nov. 17, 1951).
279. "Cold cast chemical equipment," Modern Plastics *29*, 88, 89 (June 1952).
280. "Safety windows," Modern Plastics *29*, 164 (Feb. 1952).
281. "Wiper blades," Modern Plastics *29*, 164 (June 1952).
282. "Plastic belting for underground conveyors," Plastics (London) *17*, 15, 10 (Jan. 1952).
283. "Personnel protection by PVC," Brit. Plastics *25*, 3-6 (Jan. 1952).
284. "Gloves," Modern Plastics *29*, 166 (Apr. 1952).
285. "Precision moldings for the textile industry," by A. Beecham, Brit. Plastics *25*, 257-261 (Aug. 1952).
286. "Vinyl wheels," Modern Plastics *29*, 170 (July 1952).
287. "Better cars, more plastics," Modern Plastics *29*, 71-80, 162-166, 168-170, 172 (Aug. 1952).
288. "Automotive plastics," by J. Totten, SPE J. *8*, 19, 20, 22 (May 1952).
289. "Brake lining manufacture," by H. Beever, Brit. Plastics *25*, 146-150 (May 1952).
290. "Bonding of friction fabric," by G. S. Learmonth, Plastics (London) *16*, 340-341 (Dec. 1951).
291. "Safety on the United States," Modern

#572 "Side Lever" Slide Catch, only size.
#522 Catch
#581 Catch
#223 "Round Button" Slide Catch, only size.
Items Illustrated Actual Size:
Presto Catches
Sell More
PLASTIC BOXES
The simple addition of a Presto catch gives plastic boxes a new look, more value. And, it's one sure way of giving your sales a lift.
The success of Presto catches on many items is proven every day. Presto is America's largest supplier of hardware for jewel cases, luggage, handbags, brief cases, etc.
For complete information on the Presto line, write today!
Presto's New Catalog Is Here!
Presto Lock Catalog
"Manufacturers of America's Largest, Most Complete Line of Luggage Hardware"
PRESTO LOCK COMPANY
100 Outwater Lane, Garfield, N. J.
Direct New York Wire: CHickering 4-0043

PLASTICS *30*, 164, 166 (Sept. 1952).

292. "Laboratory evaluation of materials for marine propulsion gears," by M. R. Gross, Proc. ASTM, 701-718 (1951).

293. "Laminates for railways," Brit. Plastics *24*, 368-371 (Nov. 1951).

294. "Aircraft plastics structures," by H. W. Hall and J. E. Gordon, Aircraft Production *13*, 211- 214 (July 1951).

295. "Aircraft adhesives, sealers, and coatings," by I. G. Christensen, Aeronautical Eng. Rev. *10*, 10-16 (Aug. 1951).

296. "Resin adhesives," by E. C. Lenz and R. Stone, Modern Packaging *25*, 94-97, 180, 182, 185 (June 1952).

297. "Butadiene-methacrylic acid copolymers as rubber-to-steel adhesives," by C. E. Frank, G. Kraus, and A. J. Haefner, Ind. Eng. Chem. *44*, 1600-1602 (July 1952).

298. "Engineering uses for rubber adhesives," by R. W. Piper, Product Eng. *23*, 130-133 (Feb. 1952).

299. "Selecting special-property organic finishes," by A. L. Alexander, Electrical Mfg. *50*, 106-109, 296, 298, 300, 302 (Aug. 1952).

300. "Improving the corrosion resistance of metal surfaces," by A. L. Alexander, Electrical Mfg. *49*, 112-115, 258, 260, 262, 264, 266 (Feb. 1952).

301. "Adhesives of lacquers to non-ferrous metals," by L. R. Brantley, A. Woodward, and G. Carpenter, Ind. Eng. Chem. *44*, 2386-2389 (Oct. 1952).

302. "Diffusion of sodium chloride through various paint systems," by W. W. Kittelberger and A. C. Elm, Ind. Eng. Chem. *44*, 326-329 (Feb. 1952).

303. "Coatings," by T. G. Rochow and R. W. Stafford, Analytical Chem. *24*, 232-237 (Feb. 1952).

304. "Phenolic air-conditioning unit," MODERN PLASTICS *29*, 160 (Aug. 1952).

305. "Translucent door," MODERN PLASTICS *30*, 162 (Dec. 1952).

306. "Fibrous glass tile," MODERN PLASTICS *30*, 183 (Oct. 1952).

307. "Counter tops molded to shape," by L. G. Derbyshire, MODERN PLASTICS *29*, 103-105 (Apr. 1952).

308. "Greenhouse screen," MODERN PLASTICS *29*, 168 (Apr. 1952).

309. "Translucent venetian blinds," MODERN PLASTICS *29*, 87 (June 1952).

310. "Reinforced polyester awnings," MODERN PLASTICS *29*, 174 (June 1952).

311. "What is the equipment designer's experience with dielectrics?" by L. E. Sieffert, Electrical Mfg. *48*, 119-121, 240, 242, 244 (Dec. 1951).

312. "Research progress in dielectrics," by A. E. Javitz, Electrical Mfg. *49*, 90-96, 230, 232, 234, 236, 238, 240 (Jan. 1952).

313. "A new form of mica insulation," by H. A. Letteron, Electrical Mfg. *49*, 142-143, 336, 338, 340, 342 (June 1952).

314. "Electrical insulating tapes in small appliances," by T. Ulrich, Electrical Mfg. *50*, 96-97, 304 (Aug. 1952).

315. "Radiation demonstrator," MODERN PLASTICS *29*, 90, 91 (May 1952).

316. "Flexable cast," MODERN PLASTICS *30*, 197 (Nov. 1952).

317. "From porcelain to plastics," MODERN PLASTICS *30*, 99-100 (Nov. 1952).

318. "Chemicals in food," by A. J. Lehman, Assoc. Food and Drug Officials of the United States *15*, 82-89 (July 1950).

319. "Food in tubes," MODERN PLASTICS *30*, 178 (Oct. 1952).

320. "Liquids in film," Modern Packaging *25*, 196-198 (Mar. 1952).

321. "Plastics used in new liquid packaging," Brit. Plastics *24*, 426-427 (Dec. 1951).

322. "Semi-rigid vacuum pack," Modern Packaging *25*, 106-107 (Feb. 1952).

323. "One portion at a time," MODERN PLASTICS *29*, 84-85 (May 1952).

324. "More plastics in a telephone," by L. W. Droel, MODERN PLASTICS *30*, 89-91 (Dec. 1952).

325. "Plastics in the telephone exchange," Brit. Plastics *24*, 400-406 (Dec. 1951).

326. "Plastics revolutionize telephone exchange switchboard," Brit. Plastics *25*, 112-114 (Apr. 1952).

327. "Automatic alarms," MODERN PLASTICS *30*, 167 (Dec. 1952).

328. "Better film viewers with plastics," MODERN PLASTICS *29*, 81-83, 182 (June 1952).

329. "Slide projector," MODERN PLASTICS *30*, 165 (Dec. 1952).

330. "Densified woodwinds," MODERN PLASTICS *30*, 101, 206 (Nov. 1952).

331. "Plastics in welding equipment," Plastics (London) *16*, 280 (Oct. 1951).

332. "Synthetic resins for the foundry," Plastics (London) *17*, 231-232, 234 (Aug. 1952).

333. "Plastics in furniture—a critical analysis," by J. B. Singer, Plastics (London) *17*, 89-91 (Apr. 1952).

334. "Plastics applications in household appliances," by F. A. Martin, SPE J. *8*, 28-35 (Mar. 1952).

335. "Servel goes 'all plastic'," MODERN PLASTICS *30*, 111-113, 207-210 (Nov. 1952).

336. "Keeping butter better," MODERN PLASTICS *29*, 94, 95 (May 1952).

337. "Plastic moldings in refrigerators," Plastics (London) *17*, 4-5 (Jan. 1952).

338. "Paper plates that take a beating," MODERN PLASTICS *29*, 82-83 (Feb. 1952).

339. "On stage with plastics," MODERN PLASTICS *30*, 94-97, 181, 183 (Sept. 1952).

340. "Trends in toys," MODERN PLASTICS *29*, 71-75 (June 1952).

Properties, Testing, Specs.

341. "On the accuracy of extrapolated creep-test relations for Plexiglas subjected to various stresses," by J. Marin and Y. Pao, Trans. ASME *74*, 1231-1240 (Oct. 1952).

342. "Stress relaxation in plastics and insulating materials," by E. E. Wright, ASTM Bull. No. 184, 47-49 (Sept. 1952).

343. "Measurement of residual stress in thermosetting plastics," by R. DeWaard, C. R. Stock, and T. Alfrey, Jr. ASTM Bull. No. 181, 53-59 (Apr. 1952).

344. "Mechanical properties of plastics," Brit. Plastics *25*, 137-138 (Apr. 1952).

345. "An electrical extensometer for determining elongation of elastomers," by C. H. Klute, C. J. Penther, and L. B. McKee, ASTM Bull. No. 180, 44-49 (Feb. 1952).

346. "Electrical analog method for studying elastomer behavior," by R. B. Stambaugh, Ind. Eng. Chem. *44*, 1590-1594 (July 1952).

347. "Impact strength of some thermosetting plastics at low temperatures," by J. J. Lamb, D. A. George, H. A. Baker, and L. E. Seiffert, ASTM Bull. No. 181, 67-70 (Apr. 1952).

348. "Physical properties of natural and synthetic rubber materials at low temperatures," by J. Z. Lichtman and C. K. Chatten, Analytical Chem. *24*, 812-818 (May 1952).

349. "Fatigue machines for low temperatures and for miniature specimens," by W. N. Findley, P. G. Jones, W. I. Mitchell, and R. L. Sutherland, ASTM Bull. No. 184, 53-55 (Sept. 1952).

350. "Abradoflex abrasion resistance tester," by M. C. Shaw, ASTM Bull. No. 180, 49-52 (Feb. 1952).

351. "Wear resistance of vulcanized elastomers," by J. C. Burns and E. B. Storey, Ind. Eng. Chem. *44*, 825-830 (Apr. 1952).

352. "Frictional and elastic properties of high polymeric materials," by B. Lincoln, Brit. J. Appl. Phys. *3*, 260-263 (Aug. 1952).

353. "Thermal conductivity of anisotropic materials," by H. Freiling, R. E. Eckert, and J. W.

SAVE TIME and MONEY

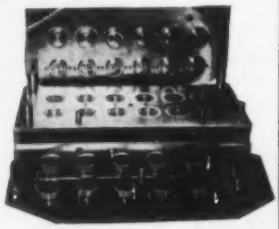
by letting us create

Pre-Mold Models

We follow through with

Quality tested Production Molds

INJECTION
COMPRESSION
TRANSFER MOLDS



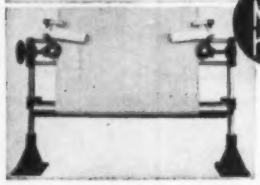
STRICKER-BRUNHUBER CORP.
Mechanical Developers
19 WEST 24th ST. NEW YORK 10, N. Y.

CONTROLLED FEEDING
FATTENS YOUR PROFITS!

Mount Hope

FREE WHEELING EXPANDER

Removes wrinkles and creases before entering next machine. Holds to full width all tire-cord, paper, rubber and plastic films and all types of fabrics.



Mount Hope

PRECISION GUIDER

Positive but gentle control—fully automatic. Maintains accurate lateral alignment on all types of material from heavy sheeting to delicate films.

Other Mount Hope Film and Sheet Handling Devices

1. Mount Hope Open Width Tension Device . . . controls tension.
2. Mount Hope Skewed Weft Straightener . . . sets weft at right angles to warp.
3. Mount Hope Bowed Weft Straightener . . . takes the curve out of bowed filling.
4. Mount Hope Continuous Roll Feed . . . permits sewing on fresh roll at full machine speed.
5. Mount Hope Plaiter . . . ball bearings—neoprene covered draw rolls.

DEPT. M

MOUNT HOPE MACHINERY COMPANY
15 FIFTH STREET, TAUNTON, MASSACHUSETTS

AUBURN BUTTON WORKS
INCORPORATED

PLASTIC PARTS PROPERLY
PRODUCED SINCE 1876

Our Diversified Facilities Include:

- Compression, transfer and high speed plunger presses up to 500 tons capacity
- Extrusion machines up to 4½" screw size
- Automatic rotary presses for small parts
- Injection machines up to 22 oz. capacity
- Fibreglass preforming equipment and molding presses
- Vacuum forming for sheets up to .125"
- Tool and die shop • Engineering services

MAIN OFFICE AND FACTORIES
AUBURN, NEW YORK
SALES REPRESENTATIVES CONVENIENTLY LOCATED

ENGRAVE
PANELS OF ANY DIMENSIONS
IN YOUR OWN SHOP
with the Engravo Graf
PORTABLE MODEL I-S

The only portable machine which reproduces 15 sizes from one master alphabet.

The only one with adjustable copy holding slides for multi-line engraving in one set-up.

Self-centering holding vise for nameplates.

Send for Booklets
I-S20 portable model • H20 heavy duty model

NEW HERMES, Inc. 13-19 University Place, N.Y. 3
In Canada: 359 St. Jacques St., Montreal
World's Largest Manufacturer of Portable Engraving Machines

Westwater, Ind. Eng. Chem. *44*, 906-910 (Apr. 1952).

354. "Measurement of refractive index of elastomers," by A. Arnold, I. Madorsky, and L. A. Wood, Analytical Chem. *23*, 1656-1659 (Nov. 1951).

355. "A 'Color Index' for floor tile resins," by B. A. Reeves, ASTM Bull. No. 178, 62-64 (Dec. 1951).

356. "Light stability of polystyrene and polyvinylidene chloride," by L. A. Matheson and R. F. Baer, Ind. Eng. Chem. *44*, 867-874 (Apr. 1952).

357. "Arc resistance: (I) tracking processes in thermosetting insulating materials," by M. Olyphant, Jr., ASTM Bull. No. 181, 60-67 (Apr. 1952).

358. "Arc resistance: (II) effect of testing conditions on tracking properties of thermosetting insulating materials," by M. Olyphant, Jr., ASTM Bull. No. 185, 31-38 (Oct. 1952).

359. "Effect of moisture and fungus on plastic insulating materials," by R. K. Witt, J. J. Chapman, and B. L. Raskin, Modern Plastics *30*, 119, 120, 122, 202, 203 (Sept. 1952).

360. "Effects of moisture and mildew on electronic equipment," by J. M. Leonard, Electrical Mfg. *50*, 98-103, 316, 318, 320 (Sept. 1952).

361. "Fungal requirements in government specifications," by S. Ruggeri, Electrical Mfg. *50*, 115-116, 302, 304, 306, 308, (Aug. 1952).

362. "Sorption of water vapor by proteins and polymers IV.," by B. Katchman and A. D. McLaren, J. Am. Chem. Soc. *73*, 2124-2127 (May 1951).

363. "Gas permeability of films," by A. H. Landrock and B. E. Proctor, Modern Packaging *25*, 131-135, 191-201 (June 1952).

364. "Separation of gases by means of permeable membranes," by D. W. Brubaker and K. Kammermeyer, Ind. Eng. Chem. *44*, 1465-1474 (June 1952).

365. "Predicting film durability," by V. L. Simril and D. W. Flierl, Modern Packaging *25*, 130-134, 176, 178 (Dec. 1951).

366. "Flexing-test device," by P. A. Gelber and J. H. Bowen, Jr., Modern Packaging *25*, 125-128, 178-179 (Jan. 1952).

367. "More packaging institute proposals," Modern Packaging *25*, 134-137 (Apr. 1952).

368. "An instrument for determining the setting time of hot-press adhesives," by N. A. de Bruyne, Brit. Plastics *25*, 156-159 (May 1952).

369. "Some basic ideas on adhesion," by N. A. de Bruyne, Plastics (London) *16*, 308-309 (Nov. 1951).

370. "New blocking-point test," by H. M. Farnham, W. A. Herbst, and H. F. Hitchcox, Modern Packaging *25*, 257-260 (Mar. 1952).

371. "Evaluation of waxed-paper seals," by J. W. Padgett, E. A. Yermakoff and S. T. Van Esselstyn, Modern Packaging *25*, 121-129 (Feb. 1952).

372. "Evaluation of heat-seal adhesives," by H. Wittcoff and D. Peerman, Modern Packaging *26*, 135-140 (Nov. 1952).

373. "Fatigue tests under axial loads of aluminum joints bonded with a resinous adhesive," by W. N. Findley, B. A. Century, and C. P. Hendrickson, ASTM Bull. No. 179, 67-71 (Jan. 1952).

374. "Effect of temperatures from -70° to 600°F. on strength of adhesive-bonded lap-shear specimens of clad 24S-T3 aluminum alloy and of cotton- and glass-fabric plastic laminates," by H. W. Eickner, W. Z. Olson, and R. F. Blumquist, Nat. Advisory Com. Aero. Tech. Note No. 2717, 26 pp. (June 1952).

375. "Chromatography comes of age," Chem. Eng. News *30*, 4244-4248 (Oct. 13, 1952).

376. "Separation and identification of polymethylol phenols by paper chromatography," by J. H. Freeman, Analytical Chem. *24*, 955-959 (June 1952).

377. "Interlaboratory study on determination of acetyl in cellulose acetate," Analytical Chem. *24*, 400-403 (Feb. 1952).

378. "Determination of sodium carboxmethyl cellulose in detergent mixtures," by H. C. Black, Jr., Analytical Chem. *23*, 1792-1795 (Dec. 1951).

379. "Colorimetric determination of methyl cellulose with anthrone," by E. P. Samsel and R. A. DeLap, Analytical Chem. *23*, 1795-1797 (Dec. 1951).

380. "Determination of Methyl methacrylate by oxidative titration," by S. Dal Nogare, L. R. Perkins, and A. H. Hale, Analytical Chem. *24*, 512-515 (Mar. 1952).

381. "Infra-red determination of free phenol in phenol-formaldehyde resins," by J. J. Smith, F. M. Rugg, and H. M. Bowman, Analytical Chem. *24*, 497-501 (Mar. 1952).

382. "An improved water extraction test for polyvinyl chloride elastomers," by E. F. Schulz, ASTM Bull. No. 183, 75-78 (July 1952).

383. "Method of colloid titration (a new titration between polymerions)," by H. Terayama, J. Polymer Sci. *8*, 243-253 (Feb. 1952).

384. "Mechanical properties of discrete polymer molecules," by W. O. Baker, W. P. Mason, and J. H. Heiss, J. Polymer Sci. *8*, 129-155 (Feb. 1952).

385. "Effect of chemical composition on selected physical properties of linear polymers," by E. F. Izard, J. Polymer Sci. *8*, 503-518 (May 1952).

386. "Ratio of tensile strength to melt viscosity for high polymeric materials," by R. F. Boyer, J. Polymer Sci. *9*, 289-294 (Oct. 1952).

387. "Viscosity of dilute and moderately concentrated polymer solutions," by S. G. Weissberg, R. Simha, and S. Rothman, J. Research Nat. Bur. Standards *47*, 298-314 (Oct. 1951).

388. "Effect of the velocity gradient on intrinsic viscosity of polymers in solution," by A. Peterlin, J. Polymer Sci. *8*, 621-632 (June 1952).

389. "Vibrating-plate viscometer," by J. G. Woodward, Electronics *25*, 98-100 (Feb. 1952).

390. "Molecular weight dependence of intrinsic viscosity of polymer solutions," by W. R. Krigbaum, L. Mandelkern, and P. J. Flory, J. Polymer Sci. *9*, 381-384 (Oct. 1952).

391. "An anomalous property of polyvinyl alcohol membranes," by H. T. Hookway and R. Townsend, Research *4*, 380-381 (Aug. 1951).

392. "Size and shape of the molecules in artificially branched polystyrene," C. D. Thurmond and B. H. Zimm, J. Polymer Sci. *8*, 477-494 (May 1952).

393. "Control of dust in solutions for turbidimetry," by C. D. Thurmond, J. Polymer Sci. *8*, 607-609 (June 1952).

394. "Statistics of linear macromolecules with a relatively short chain. IV. Molecular dimensions from viscosity and sedimentation," by A. Peterlin, J. Polymer Sci. *8*, 173-185 (Feb. 1952).

395. "Effect of solvation on sedimentation experiments," by M. Wales and J. W. Williams, J. Polymer Sci. *8*, 449-456 (May 1952).

396. "A method for determining the propagation constants of plastics at ultrasonic frequencies," by H. J. McSkimin, J. Accoustical Soc. America *23*, 429-434 (July 1951).

397. "Utilization of ultrasonics in the plastic industry," by W. S. Penn, Plastics (London) *16*, 317-319 (Nov.): 351-352 (Dec. 1951).

398. "Evaluation of several types of replicas," by J. J. Comer and F. A. Hamm, Analytical Chem. *24*, 1006-1015 (June 1952).

399. "ASTM standards—their effect on plastics technology," by R. Burns, ASTM Bull. No. 183, 78-80 (July 1952).

400. "Report of nomenclature in the field of macromolecules. International Union of Pure and Applied Chemistry," J. Polymer Sci. *8*, 257-277 (Mar. 1952).

401. "New British standards for PVC products," Brit. Plastics *24*, 374-375 (Nov. 1951).

402. "A systematic standardizing procedure for electrical moldings," by W. D. Owen, Brit. Plastics *25*, 188-193 (June 1952).

403. "Report of A.S.T.M. Committee D-20 on Plastics," Proc. ASTM *52*, preprint (1952).

404. "Report of A.S.T.M. Committee D-14 on Adhesives," Proc. ASTM *52*, preprint (1952).

—END

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Soil Conditioners

THERE are going to be neither gushing rivers of $9-a-gallon soil conditioners nor hundreds of trainloads of resins for this same purpose cluttering up the landscape in this country for a long time to come. Despite all the trumpeting that has blared forth throughout the country in the past year, soil conditioner sales are still comparatively small and likely to remain so indefinitely.

At least that is the opinion of an authority who must remain nameless but is certainly in a position to know what is happening to this miracle stuff that will purportedly make voluptuous pansies grow where only ugly thistles dared to stick up their prickly heads before. "Like many other plastics in their early history," he says, "soil conditioners have been over-promoted, over-emphasized, and over-exaggerated. Their possibilities have been abused, aborted, and thereby delayed because of the mad rush to get them on the market before proper testing and experience were allowed to govern their proper application."

Consumer Tests—In answer to adverse criticism of their merchandising methods, however, producers of soil conditioners say that their claims have advanced progress because customers have hastened to experiment. From the customers' tests came much of the knowledge about when and how conditioners can be advantageously used. It is now well known that different soils, temperature, weather, and other factors all require different concentrations of conditioner compound, and experience gained from thousands of consumer tests will continue to contribute a wealth of knowledge to the complex problem.

One of the producers asserts that a questionnaire showed that 67.8% of those questioned expressed a favorable or partially favorable experience with his product; that he has to live up to his claims if his firm is to stay in business; that in actual tests, a 1½-in. penetration of his conditioner in a rose bed increased the wood 10% and increased rose blooms from 36 on untreated to 52 on treated soil, while it helped celery not one whit; also, that his material made vegetation grow on an industrial school playground where it would never grow before because of constant traffic.

Resin Consumption—According to our authority, from whom we obtained the following information, the volume of actual resin used for soil conditioners from mid-1953 to mid-1954 will not be much over 4 million pounds. In the calendar year of 1952, it is doubtful that more than 2½ million lb. has been consumed. It is possible that within the next few years a steady market of from 3 to 5 million lb. annually will be used for home gardens and large "estates." But as can be seen from these figures, our informant sees no great volume for the "farm" market as long as that $9-a-gallon figure, or anything near that figure, predominates. He thinks it is ridiculous to compare future soil conditioner volume with fertilizer volume for a long, long time to come, if ever. However, a 50 million lb. goal in the next 5 or 10 years is not unrealistic.

The materials involved in this program are numerous and increasing. They are sodium polyacrylate, maleic acid, vinyl acetate, ethylacrylate, CMC, and several others. The field is shot through with highly complex problems. Disappointment from inexpert application can cause serious delays in wide-scale adoption of what is really a magnificent project if allowed to take a normal development course. It is, however, presently, endangered by the too frequent use of such words as "sensational," "colossal," "miraculous," when a new product is put on the market.

First Starters—The first material to get wide publicity as a soil conditioner was sodium polyacrylate. It starts as acrylonitrile latex which is polymerized and then hydrolized with sodium hydroxide to obtain sodium polyacrylate. Then came a copolymer of vinyl acetate and maleic acid which the manufacturer claims will do a better job in many instances.

Calcium acrylate is one of the materials that helped start the soil conditioner ball rolling. The Armed Services spent a lot of time and money trying to use it as a medium for crusting plain dirt into a surface on which airplanes could land. The idea was to build temporary advance air base landing fields in a hurry simply by mixing the soil with calcium acrylate. So far, the idea has not crystallized. Engineers say it would cost from 50¢ to 60¢ a sq. ft. and is impractical, anyhow, because heavy machinery would have to be flown in to process the earth deep enough so that airplane wheels would not penetrate the crust. The length of time required to prepare a field would take so long that no advantage would be acquired. Another experiment preceding the air field work was the use of acrylates in oil well drilling mud. Apparently calcium acrylate compacts the soil rather than loosens it up as does sodium acrylate. From this study of using acrylates for soil treatment, plus research of private companies, finally came the knowledge that has resulted in commercial production of synthetic soil conditioners.

How They Work—The theory involved is that these plastic soil conditioners hold the agglomerates in place after mechanical breaking up of the soil so that roots of plants will have a better chance to spread out and pick up nutrient. Water penetration and aeration of the soil are improved. It is believed that natural calcium and other chemical ions in soil stratify and harden the clay, causing it to form layers of hard soil in between layers of water—a sort of lamination. The sodium ions in sodium acrylate, however, replace the calcium ion and aid in crumbling the soil into agglomerates rather than layers. If excessive sodium is used, it releases too much calcium and the ion exchange between sodium and calcium is reversed, thus creating a very hard soil. The conditioner then

* Reg. U.S. Pat. Off.

VISIBILITY

by Swedlow

The BOEING B-47 stratojet is the fastest known bomber in the world. This great six-jet engine powered, swept-wing bomber will be produced in quantity for the U.S. Air Force by Boeing Airplane Company, Wichita, Kansas, the Douglas Aircraft Co., Tulsa, Oklahoma and the Lockheed Aircraft Corp., Marietta, Georgia.

Transparent laminated canopies and all-nylon fuel cell backing (in accordance with Boeing specification BMS-8-13) are SWEDLOW's contributions to the admirable functional efficiency of this superb fighting machine.

SWEDLOW was selected as a major supplier of these important factors because of SWEDLOW's unique reputation and more than a decade of experience in the development and fabrication of vital parts for the aircraft industry.

● ***We shall be glad to assign our staff engineers to work with you in solving problems in all phases of plastic fabrication.***

THE PLASTISCOPE

becomes a compactor rather than a "loosener-upper."

A conditioned soil will hold about 20 to 40% of the moisture applied. On unconditioned clay soil, the moisture runs off or stays on top without penetration.

There is a great difference of opinion among technicians concerning this theory and how the soil is affected by these various types of synthetics. Some insist that the soil can be aggregated by sprinkling on the resin in solution. Another school insists that the soil cannot possibly be aggregated by sprinkling or so-called chemical treatment. They state that the resin must be dug into the soil in order to prevent restratification. They will concede that if erosion is the only problem involved, a sprinkling job with a heavier concentration will do the trick since a crusted soil is then the desirable attainment.

Protagonists for liquid sodium polyacrylate claim it is necessary only to penetrate the top 1 or ½ in. of a turf soil in order to gain the desired results and that the turf or lawn would have to be treated only every three or four years. Here again, others assert that sprinkling is not satisfactory.

For most plants other than grass, there is general agreement that a ½- or 1-in. penetration of the soil by a conditioner is not sufficient. For a crop like corn it must go down at least 3 or 4 in. and would have to be re-applied every two or three years. A perplexing problem in this case, according to some technicians, is the difficulty of "working-in" the conditioner to a depth of more than 1½ or 2 inches.

Yes, there is a new baby in the plastics family, but his parents are undecided whether he is going to be just an ordinary little feller or a big, bruising giant.

Dress Up With Polyethylene

INCREASED use of polyethylene for dressing up merchandise to be sold across the retail counter is expected to account for thousands of pounds of polyethylene in the near future in a branch of the packaging industry where polyethylene has been held back heretofore because of scarcity. One of the items now being used for this purpose is Shellmar's Shellene (polyethylene) double envelope for women's hosiery.

The envelope is being offered as a special gift by Bossong Hosiery Mills, Inc., Asheboro, N. C., in a sales attempt to spur the sale of three-pair boxes of hosiery. Emphasis is placed on the feature that the envelope provides snag-free storage for two pairs of the three-pair purchase, while the third pair is being worn.

Premium packaging of this type is comparatively new in polyethylene. Producers believe that if this field is promoted, it will yield unbelievable results in volume sales.

Vinyl Surgical Dressing

DEVELOPMENT of a transparent vinyl dressing, Aeroplast, has been announced by the United States Air Force for possible emergency use in case of atomic attack or other large-scale disasters.

The compound, applied directly to burned or injured portions of the body from an aerosol-type pressurized container, provides instant protection. No gauze bandages are necessary when this plastic dressing is used. It also can be applied to parts of the body poorly adapted to the use of bandages.

Protective Treatments, Inc., Dayton, Ohio, worked with the Air Force in the development of the compound.

Low Cost, High-Impact Material

ANNOUNCEMENT of a family of new low cost thermosetting plastics with extremely high impact values has been made by The Richardson Co., 2747 Lake St., Melrose Park, Ill.

The material, called Im-Plast, has been successfully used to produce automotive-type storage battery containers at costs comparable with conventional products being currently used.

Low-Temperature Plasticizer

AN auxiliary plasticizer for polyvinyl chloride film and sheeting that is well adapted for low-temperature applications is a product of Atlas Powder Co., Wilmington, Del.

The plasticizer, called Pycal 70, is a phenoxyethyl oleate and owes its low volatility to high molecular weight. It sells well below the average price of low-temperature plasticizers.

Butyrate Gas Pipe

LARGE-size newspaper advertisements are being published in Southern California newspapers boasting that the Southern California Gas Co. is using cellulose acetate butyrate piping to service its customers. The advertisements tell the customers to watch the replacement of old gas lines running from the house to the main and they will see crews inserting the plastic pipe through the old gas pipe. The company states that this flexible butyrate tubing saves lawns, flower beds, and paving because digging is limited to two spots—one by the meter, one in the street.

The utility company reports that plastic piping was first used as a substitute in 1945. Samplings since then have shown it to be still in good operating condition and to show no defects or mechanical weaknesses.

Glue for Plastics

CALLED Uniplast, an adhesive intended primarily for gluing all types of plastics has been announced by Postamatic Co., 1545 Belfield Ave., Philadelphia, Pa. It is claimed to be particularly applicable for mending plastics toys, housewares, and other plastics items used in the home, shop, store, and office.

Uniplast is used by simply applying it sparingly to the surfaces which are to be joined and then using finger pressure for about 10 seconds.

Vinyl Conveyor Belt

CONVEYOR belts with extremely dirt- and abrasion-resistant white vinyl coatings are being produced by Main Belting Co., 1241 Carpenter St., Philadelphia, Pa. The pores of the belt are so minute that they do not readily collect dust or dirt. While the surface of the belt is very dense, the belt itself is flexible and is reported to have a long service life.

A paper company is now using this vinyl belt for conveying dissolving pulp sheet used in the manufacture of rayon. The belt is also recommended for conveying copra, food-

no more GAMBLING on tool steel selection"

[⅓ actual size; Selector is in 3 colors]

That's what one of the thousands of pleased users says about his CRUCIBLE TOOL STEEL SELECTOR, the new, simple, handy method of picking the right steel, *right* from the start. Since Crucible announced this Selector two years ago, thousands of tool steel users have received their Selectors . . . and here's what some of them say —

"Handiest selector I've ever seen!"

"Saves me time and headaches"

"It's so logical—you begin with the application".

You can be sure the answer you get with your Crucible Tool Steel Selector will be just right in every case, for this Selector covers 22 tool steels which fit 98% of all tool steel applications. And when—with a flip of the round dial—you get the answer, you'll get the steel FAST, too, because all the tool steels on the Selector are right in stock, in all our 26 conveniently-located warehouses.

This Selector is bound to be a big help to you—so write for yours today. There is no obligation whatsoever. Just fill in the coupon and mail now . . . before you turn this page and forget! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, New York.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!

Crucible Steel Company of America
Dept. MO, Chrysler Building
New York 17, N. Y.
Gentlemen:
Sure! I want my free CRUCIBLE TOOL STEEL SELECTOR!

Name_____ **Title**_____

Company_____

Street_____

City_____ **State**_____

CRUCIBLE first name in special purpose steels

TOOL STEELS

52 years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

THE PLASTISCOPE

stuffs, and other materials where absolute cleanliness is essential, or for use in plants open for public inspection where a clean, white belt is desirable.

Class B Insulation

ELECTRICAL insulation consisting of Mylar polyester film bonded to Quinterra asbestos papers in duplex and triplex combinations has been announced by Irvington Varnish & Insulator Co., Irvington, N. J.

This new Class B insulation, called Irv-O-Bestos, not only has high tensile and tear strength, but exceptional dielectric strength as well. For example, the 0.003-duplex construction has a dielectric strength of 1900 VPM with ¼-in. electrodes, and 1500 VPM with 2-in. electrodes.

Suggested applications for this material are as motor and dry-type transformer insulation, magnet wire insulation, and coil and relay, sheet, and primary cable insulation.

A technical data sheet containing typical test data and samples can be obtained from the company's Sales Promotion Department.

Dry Polyester

FABRICATORS of fibrous glass reinforced boats, auto bodies, and other large items where low temperature cure is normally desired will be interested in a new solid polyester resin, Atlac LV. After dissolving in styrene, the resin possesses a viscosity in the low range required for application to fibrous glass or other types of preforms by spraying, dipping, or brushing.

Atlac is the trade-mark for the line of dry polyesters produced by Atlas Powder Co., Wilmington, Del. Like other Atlac products, Atlac LV is supplied in the form of free-flowing granules, which eliminates the inconvenience of premature cure in storage or shipment.

Floating Tank Covers

TRANSPARENT, chemically-inert acrylic covers for round stainless-steel chemical mixing and storage tanks have been announced by Reco Sales Co., 70 E. 45th St., New York, N. Y. These covers fit closely against the sides of the tanks and actually float on top of the contents, thus greatly reducing the possibility of contamination, evaporation, and oxidation. In a 90-day test period, it was revealed that oxidation of solutions stored in these tanks amounted to as little as 1 percent.

Because the covers are transparent, it is possible to check the tanks' contents visually at all times. Should entrapped air bubbles appear, a mere spin of the cover will send them to the outer edge where they will be freed.

Standards for Vinyl

SIXTEEN styles of vinyl-coated sheetings have been added to an original list of 20 vinyl-coated fabrics and 25 pyroxylin-coated fabrics in a revision of the Simplified Practice Recommendation for Vinyl and Pyroxylin-Coated Cotton Fabrics to become effective Jan. 1, 1953. Approved for promulgation by the Commodity Standard Div., Office of Industry and Commerce, U. S. Dept. of Commerce, the revised recommendation will be identified as R242-53.

The department was assisted in developing the revised recommendation by users and distributors of the materials and by the materials' manufacturers working through their association, the Plastics Coatings and Film Association.

The purpose of simplified practice recommendations, whose adoption and use are voluntary, is to eliminate avoidable waste through the establishment of standards of practice for stock sizes and varieties of specific commodities that currently are in general production and demand. For each style of fabric, the recommendation gives the width in inches and the linear yards per pound of the gray fabric before coating, and the minimum width and weight per linear yard of the coated fabric. The recommendation also contains a useful table which enables technicians and others to compare the various styles of fabrics on the basis of weight per square yard.

As soon as they are available, free printed copies of the revision will be mailed to all acceptors on record. Additional copies may be purchased at that time from the Superintendent of Documents, Government Printing Office, Washington, D. C. Mimeographed copies may be obtained from the Commodity Standards Div., Office of Industry and Commerce, Washington, D. C.

Fluorocarbon Error

IN the December issue of MODERN PLASTICS, the wrong address for National Engineering Products, Inc., appeared in the article "Fluorocarbons Face Fame and Fortune." The company, located in Washington Bldg., Washington 5, D. C., was erroneously listed as a New York firm.

National Engineering Products, whose vice president is Clinton ("Pete") Rector, former head of the Plastics Unit of the old War Production Board, is the producer of Temp-lube No. 56, a fluorinated hydrocarbon paste-like material which is designed for sealing joints, and of Rodpax No. 7, a fluorocarbon packing material for sealing around valve stems.

EXPANSION PLANS

Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y., has begun construction of a new plant in Randolph Township, N. J. The company, manufacturers of slitting and roll winding machinery, will provide extended services to the paper, textile, rubber, and plastics industries. Cameron will retain its executive offices and machining operations at its Brooklyn plant.

Du Pont will soon start construction on a $10 million plant south of Circleville, Ohio, for manufacture of Mylar polyester film. The plant, which will be operated by the company's Film Dept., is expected to go into production early in 1955 and will employ 250 persons.

Mylar was described in detail in this column last month as a material with high strength and excellent electrical properties. Combined with asbestos papers, it is being used in electrical work as reported in the item "Class B Insulation," page 204.

Texas Vitrified Pipe Co., Mineral Wells, Texas, has started construction of a 60 by 110 ft. plant for the production of plastics pipe. The plant, which will operate under the name

Faster production...lower costs for "measured in pounds" injection moldings

New booklet for injection molders tells how best to meet demand for large-sized moldings

How to get maximum results with a minimum of time and material loss is the big problem facing injection molders today, as the trend to larger and more complex moldings continues.

As solutions to this problem, concentrated attention has been given to new molding machines . . . new mold construction techniques . . . refinements and improvements in the molding process . . . and new, improved materials.

For your guidance, Monsanto has gathered into *one* booklet the most recent information on all of these subjects . . . plus a listing of the molding problems most frequently encountered and their chief causes.

You'll find the answers to many of your questions and problems on large-sized moldings here. Send for your *free* copy of Monsanto's booklet, "Injection Molding Lustrex Styrene Plastic," today. The coupon is for your convenience.

Lustrex: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY...
WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, Plastics Division, Room 2625, Springfield 2, Mass.

Please send me your booklet, "Injection Molding Lustrex Styrene Plastic."

Name & Title _____

Company _____

Address _____

City, Zone, State _____

of **Southwestern Plastic Pipe Co.**, will be located just east of the present offices. Alvis L. Barrier will be general manager of the new company. He had previously been associated with the Plastics Div. of General Electric Co., leaving that organization to form his own company, Barrier-Pribble Co., New Haven, Ind. Mr. Barrier will retain his interest in that company, but will serve only in an advisory capacity.

Naugatuck Chemical Div., U. S. Rubber Co., announces that it is doubling the production capacity of its Marvinol vinyl resin plant in Painesville, Ohio. The company also states that the expansion program, which is expected to be completed by June 1953, will lift production to more than 50,000,000 lb. annually.

PERSONAL

Robert S. Sweeney has been named vice president and general manager of **The Watson-Stillman Co., The Hydraulic Press Div. of H. K. Porter Co., Inc.**, Roselle, N. J. He will be in charge of all manufacturing and sales activities of the division. Mr. Sweeney came to Watson-Stillman in 1944 as controller and, until his present promotion, had been vice president and treasurer.

R. E. Erdmann has joined **Mixing Equipment Co., Inc.**, as assistant manager of the New York City office at 136 Liberty St. The company manufactures Lightnin mixers and has its plant in Rochester, N. Y.

John P. Read has been appointed Midwestern industrial sales representative for **Hess, Goldsmith & Co., Inc.**, with headquarters at 509 E. Wilson St., Bryan, Ohio. In his new position, Mr. Read will cover Illinois, Minnesota, Wisconsin, Kansas, Missouri, and Indiana.

Dr. Ralph I. Dunlap is now assistant director of research for **Monsanto Chemical Co.'s Plastics Div.**, Springfield, Mass. He joined the division in 1943 as research chemist and was promoted to group leader in the Research Dept. in 1946; he became an operating superintendent in the Production Dept. in 1951, and in March 1952, returned to the Research Dept. as group leader in charge of styrene research.

George R. McMullen has joined the Sales Dept. of **Gustin-Bacon Mfg. Co.**, Kansas City, Mo. He was formerly manager of Automotive Sales and of the Transportation Div. of Owens-Corning Fiberglas Corp.

Gerry P. Mack, vice president and director of research of Advance Solvents & Chemical Corp., 245 Fifth Ave., New York, N. Y., recently returned from his annual trip abroad, where he was a delegate to the International Standardization Organization Plastics Meeting in Turin, Italy. He also attended the Plastics Fair and Exhibition in Dusseldorf, Germany. At the Plastics Fair, he spoke on the "Theoretical and Practical Aspects of Vinyl Stabilization in the United States."

Ernest H. Wyche has joined **Kenneth Tator Associates**, Coraopolis, Pa. He has had wide experience in the industrial uses of organic coatings and linings and is known for his background of experience in ferrous and non-ferrous metals.

Herman and **Larry Gering, Gering Products, Inc.**, Kenilworth, N. J., were honored at a company gathering on Dec. 25 by their employees, who presented them with a memorial plaque as a token of their esteem.

Jackson Kemper is now general manager of **Watson-Stillman Fittings Div., H. K. Porter Co., Inc.**, Roselle, N. J. He will be responsible for all operating and sales activities of the division, formerly known as Watson-Stillman Distributor Products Div., of which he was sales head. Under Mr. Kemper's supervision, the Fittings Div.'s policy of distributor merchandising will be continued and strengthened to take advantage of the company's recently completed $500,000 expansion program.

Robert M. Coulter is now with **Textileather Corp.**, 607 Madison Ave., Toledo, Ohio, as product design manager. He will devote his entire attention to the styling and designing of the company's product lines, working closely with the Sales, Technical, and Production Divs.

Bernard James Rainey has joined the engineering staff of the **Vacuum Forming Div., Auburn Button Works, Inc.**, Auburn, N. Y.

Arthur K. Doolittle, assistant research director of **Carbide & Carbon Chemicals Co.**, So. Charleston, W. Va., has been elected chairman of the American Chemical Society's Div. of Paint, Plastics, and Printing Inks Chemistry for 1953.

COMPANY NOTES

Mayflower Electronic Devices, Inc., 6014 Hudson Blvd., West New York, N. J., has set up an associate company, **Mayflower Research Development Co.** Current project of the new division is the molding of rigid or semi-rigid molded parts and bonding them to sheeting or other plastic materials. The first project was the development of new molds for snaps and rigid vinyl buttons. Soon to be started is another program for the manufacture of a screw top flange part for hot water bottles and bottom flange equipment to be used for irrigation bags by the medical profession.

Robert Collina, who is in charge of this project for joining molded plastic parts to film and sheeting, is available for contact by prospective customers. **Edward J. Wohlfarth**, head of Mayflower Electronic Devices, states that the new facilities have interested various metal fabricators who have never before been identified with the plastics industry in any way.

General Electric Co.'s alumni reunion dinner will be held in connection with the Ninth Annual Technical Conference of S.P.E. at the Hotel Statler, Boston, Mass., on Jan. 21, 1953. All present and past employees of GE's Plastics Operations are invited to attend. Reservations should be sent to Mel Haas, Bolta Products, Inc., 151 Canal St., Lawrence, Mass.

Celanese Corp. of America, 181 Madison Ave., New York, N. Y., announces that **G. W. Seymour**, vice president of the corporation, has been named to the newly established post of coordinator of process and

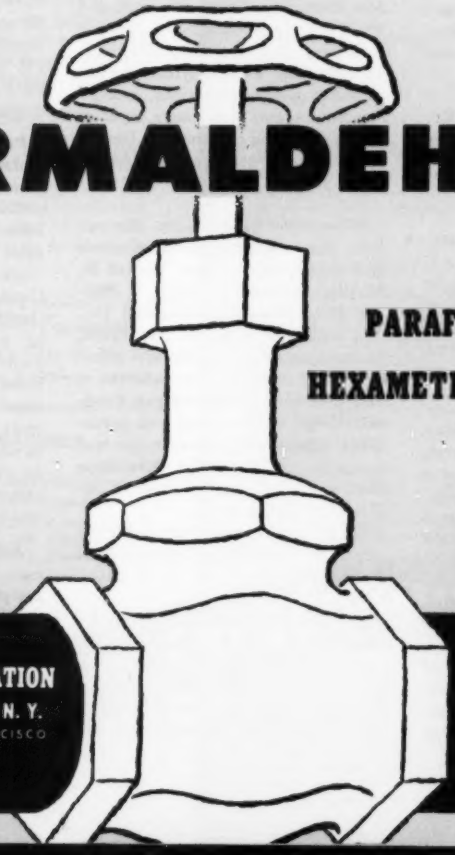
By simply opening a valve, you can put Heyden Formaldehyde to work in your process. Your pumps and pipe lines will deliver from your storage tanks a reliable raw material which will assure top quality in your finished product.

With Heyden Formaldehyde in your tanks, you have the advantage of these important features:

- **Highest purity.**
- **Constant uniformity and assay.**
- **Ease and economy of handling.**
- **Dependable source of supply.**
- **Availability as Formaldehyde Solution N.F. and 37% Methanol-free Formaldehyde.**
- **Shipment in tank cars, tank trucks, 475 lb. drums, 100 lb. carboys and 1, 5 and 9-lb. bottles.**

At the turn of a valve...

HEYDEN FORMALDEHYDE



PARAFORMALDEHYDE

HEXAMETHYLENETETRAMINE

FINE HEYDEN CHEMICALS

HEYDEN CHEMICAL CORPORATION

342 Madison Ave. • New York 17, N. Y.

CHICAGO • PHILADELPHIA • SAN FRANCISCO
DETROIT • PROVIDENCE

BENZALDEHYDE • BENZOATES • BENZYL CHLORIDE
BROMIDES, • CHLORINATED AROMATICS • CREOSOTES
FORMALDEHYDE • FORMIC ACID • GLYCEROPHOSPHATES
GUAIACOLS • HEXAMETHYLENETETRAMINE
MEDICINAL COLLOIDS • METHYLENE DISALICYLIC ACID
NEOMYCIN • PARAFORMALDEHYDE
PARAHYDROXYBENZOATES • PENICILLIN
PENTAERYTHRITOLS • PROPYL GALLATE • RESORCINOL
SALICYLATES • SALICYLIC ACID • STREPTOMYCIN

THE PLASTISCOPE

technical control for the firm's three operating divisions—Textile, Plastic, and Chemical—and for affiliated companies in Canada and Latin America.

Celanese also announces that **Dr. B. B. Allen** has been appointed manager of its Summit, N. J. research laboratories. He had been associate director.

Leather Guild, Inc., has opened a new sales office, show room, and warehouse at 33 E. 21st St., New York, N. Y. The company distributes upholstery plastics in the metropolitan area and sells exclusively to furniture designers, decorators, architects, and department stores. Leather Guild's largest percentage of sales are in stretchable supported Fedistron and Federan, plastic upholstery materials manufactured by **The Federal Leather Co.**, Belleville, N. J.

Sandee Mfg. Co., 5050 Foster Ave., Chicago, Ill., is now offering a new line of styrene alloy sheets in a wide variety of colors, in addition to extruded rigid acrylic sheets.

Detroit Mold Engineering Co., Detroit 12, Mich., has appointed **Robert J. Fox** as Eastern sales representative with headquarters at 1217 Central Ave., Hillside, N. J.

Gries Reproducer Corp. announces that ground has been broken on a 3-acre site in New Rochelle, N. Y., for construction of a 90,000 sq. ft. plant. The company will continue operating at 133rd St. and Willow Ave., Bronx, N. Y., until the new building is ready for occupancy.

Hunter Associates Laboratory, 5421 Brier Ridge Rd., Falls Church, Va., recently formed, consists of a new development, testing, and consulting group devoted exclusively to appearance and related optical properties of materials. Appearance properties include color, diffuse reflectance, gloss or luster, turbidity, haze, opacity, and the like.

Richard S. Hunter is director, and **Marshall Powell** and **James D. Ferguson, Jr.** are his associates. Mr. Hunter was formerly chief optical engineer of Henry A. Gardner Laboratory, Bethesda, Md.; Mr. Powell, an electronic engineer, was also with Gardner Laboratory; and Mr. Ferguson, a mechanical engineer, was formerly with Aviation Corp.

Dewey & Almy Chemical Co. has announced that its **Organic Chemicals Div.** is producing a new high-styrene copolymer, No. 43G, for use especially in soling, floor tile, and wire and cable insulation. The polymer provides easier processing, harder stocks, and imparts high abrasion resistance with greater flex life in both low and high gravity soling stocks. Another advantage of 43G is the greater stability in storage of uncured stocks. A bulletin is available, illustrating graphically properties imparted by the new material.

The company also announces the appointment of **Martin, Hoyt & Milne,** Merchants Exchange Bldg., San Francisco, Calif., as exclusive West Coast sales representatives for its Organic Chemicals Div. They will handle sales of copolymer resins, polyvinyl acetate emulsions, copolymer latices, and plasticizers, most of which are being produced in Dewey & Almy's new facilities at the Acton, Mass., plant.

Shawinigan Resins Corp., Springfield, Mass., announces the election of the following officers: **Robert K. Mueller**, general manager of **Plastics Div., Monsanto Chemical Co.**, was made president; **W. Roy Elliot**, Shawinigan Resins general manager, and **Charles M. Schwab**, a vice president of **Shawinigan Products Corp.**, were elected vice presidents; **Charles H. Sommer**, general manager of Monsanto's **Merrimac Div.**, was elected a member of the Board of Directors.

Shawinigan Resins Corp. is jointly owned by Monsanto and Shawinigan Products Corp.

Olympic Plastics Co., 215 E. Washington Blvd., Los Angeles 15, Calif., has appointed **William Lundberg** as production manager. The company has recently installed equipment and acquired qualified personnel for the development and production of fibrous glass reinforced plastics products.

Heyden Chemical Corp. has named **W. H. Spreen** as Midwestern district sales manager, with headquarters at the company's Chicago office, 20 N. Wacker Drive. Mr. Spreen has been manager of Heyden's Detroit, Mich., office since 1945.

Amos Molded Plastics, Div. of Amos-Thompson Corp., Edinburg, Ind., announces the appointment of **Fred Tulley** as works manager at the Edinburg plant and **Ray Daniels** as Chicago regional representative for the company. Mr. Tulley will be in charge of manufacturing in the Plastics Div.

Molded Fiberglass Tray Co., Linesville, Pa., has been formed to specialize in molded fibrous glass trays, boxes, and other shapes used for material handling. **A. W. Levenhagen** is president and general manager of the company; **J. W. Moore**, vice president and sales manager. Both men were formerly associated with **Molded Resin Fiber Co.** and have purchased from the company its orders, proprietary dies, and other equipment and inventories. Molded Fiberglas is located in a new 8000 sq. ft. building and will have 40 acres available for future expansion.

Process Industries Engineers, Inc., manufacturing and construction engineers of Pittsburgh, Pa., has appointed **Bullock-Smith Assoc.**, 136 Liberty St., New York, N. Y., as its sales representative in greater New York, northern New Jersey, and Connecticut. Bullock-Smith, an authority on the design and equipment of process plants, will represent Process Industries in the sale of its principal products—Pie-Flex mixers, impregnators, solvent recovery systems, and other process equipment. In addition, Bullock-Smith will serve as consulting and application engineers on projects originating in that territory.

Johnson Products Co., 5350 Broadway, Chicago, Ill., has introduced a cement for the repair of soft vinyl plastic articles. The material, called Johnson's Plastic Mender, can be used on rips, tears, and holes in light film as well as heavy vinyl upholstery. Other uses for the cement include turning up hems, joining

M KELLOGG W — SUBSIDIARY OF PULLMAN INCORPORATED

KEL-F

VOLUME-PRODUCTION PRICING NOW RADICALLY BROADENS SCOPE OF APPLICATIONS FOR THIS UNIQUE THERMOPLASTIC

Volume demand now measured in the hundreds of tons and improved production methods—have combined to radically reduce the per lb. cost of Kel-F. Further, experience has shown that potential applications require only small quantities of Kel-F per finished item, because of the plastic's superior properties. In view of these two facts, design engineers are currently reevaluating the use of Kel-F for all applications where the seven basic Kel-F properties meet design or performance specifications.

LEADING MOLDERS NOW OFFER KEL-F PARTS AND BASIC MATERIALS

Already, more than 50 leading molders in the country are prepared to deliver Kel-F tubing, rod, sheet, film and strip in a variety of sizes and types of material. Many of these are supplying not only these basic fabricating materials but are also producing finished parts by the standard methods such as compression, transfer, injection and extrusion molding.

TECHNICAL BULLETINS, SERVICES NOW AVAILABLE . . .

Detailed data—in bulletin form—on physical properties, molding techniques, dispersions and other Kel-F products are available. The Chemical Manufacturing Division's Technical Service Department has been augmented to offer additional help to design and materials engineers, as well as molders, in the use of this unique material.

Chemical Manufacturing Division
The* M. W. KELLOGG *Company
P. O. Box 469 • Jersey City 3, N. J.
In N. Y. WOrth 4-6775 In N. J. DElaware 3-3100

BASIC KEL-F MATERIALS AVAILABLE
(Order *direct* from Kellogg)

Molding Powders	Unplasticized	#300 — for high temperature service #270 — for less severe temperatures
	Plasticized (In Grade #300)	P20 — Containing 20% plasticizer P25 — Containing 25% plasticizer P30 — Containing 30% plasticizer
Dispersions		NW-25 — Flows readily at fusion temperatures N-1 — High molecular weight
Oils, Waxes and Greases		Five grades — from Light Oil to Hard Wax — are available. Details on request.

USE KEL-F when applications require —

Properties

CHEMICAL INERTNESS
No effect has been observed after prolonged exposure of Kel-F to concentrated sulfuric, hydrofluoric and hydrochloric acids; to strong caustic; to fuming nitric acid, aqua regia and other vigorous oxidizing materials. It is equally resistant to most organic solvents.

ELECTRICAL RESISTANCE
Kel-F has high resistance to electricity . . . is a poor conductor of heat . . . and its electrical properties are superior to most plastics. Dielectric constant is in the range of the best available materials.

ZERO MOISTURE ABSORPTION
In continuous tests, Kel-F exhibited zero water absorption. It is not wet by water . . . is unaffected by high humidity or tropical exposure.

WIDE TEMPERATURE RANGE
Kel-F performs satisfactorily over a temperature range of 710 fahrenheit degrees — from a low of —320° F (liquid nitrogen) to a high of 390° F.

MECHANICAL STRENGTH
Kel-F has high tensile strength on the order of 6000 psi at 77° F . . . excellent impact strength and abrasion resistance.

SUPERIOR MEMORY
Kel-F exhibits "cold-flow" characteristics superior to any other commercial fluoro-carbon. While it deforms slightly under pressure, it returns to original shape when pressure is released.

MOLDABILITY — MACHINABILITY
Kel-F is molded by all standard methods — compression, transfer, injection and extrusion. It is readily punched, drilled or otherwise machined to close tolerances.

PURCHASE KEL-F in any desired form —

Products

FABRICATED PRODUCTS

Gaskets
Washers
"O" Rings
"U" Packing
Valve Discs
Valve Seats
Valve Diaphragms
Pump Diaphragms
Resilient-Core "O" Rings
Drum and Tank Liners
Flexible Non-Corrosive Containers
Machined Fittings
Coated Wire
Coated Hook-up Wire
Coil Forms
Transformer Terminals
Multi-lead Terminals
Rotary Switches
Tube Socket Bases
Aerial Supports
Resistor Sleeves

FABRICATED MATERIALS

Molded Sheets
Thickness — 1/64" to 1/2"
Diameter — in disc form to 45"

Extruded Rod
Diameter — up to 1"
Length — to specification

Molded Rod
Diameter — up to 4"
Length — to 12"

Extruded Tubing
Diameter — up to 2"
Wall thickness — to specification
Length — to specification

Extruded Strip
Thickness — .010" to .125"
Width — 2" to 4"
Length — to specification

Thin Film
(EXTRUDED AS LAY-FLAT TUBING)
Thickness — .002" to .010"
Width — lay-flat up to 20" (total width to 40")

THE ONLY COMMERCIAL FLUORO-CHLORO-CARBON THERMOPLASTIC

WIDE VARIETY IN FORM
Kel-F is available in film, sheet, rod and tubes from recognized molders. As a dispersion for spray or dip application and in forms of oils, greases and waxes it is available direct from Kellogg.

List of the molders, extruders, fabricators and coaters furnishing the above listed items available on request.

THE PLASTISCOPE

seams, and putting zippers into vinyl articles. It is clear, colorless, and dries quickly without the use of heat.

Owens-Illinois Glass Co., Toledo, Ohio, announces the election of the following officers: **George S. Babcock,** manager of the Closure and Plastics Div., was elected a vice president; **Hugh C. Laughlin,** vice president and general manager of the Administrative Div., was elected executive vice president and member of the board.

Pittsburgh Plate Glass Co.'s Paint & Brush Div. has appointed **Frederick H. Cone & Co.**, 181 Front St., New York, N. Y., as its distributor of synthetic bristles.

The Rainville Co., Garden City, N. Y., announces the opening of an affiliated company in the Los Angeles, Calif., territory. The new company, bearing the same name, will be operated by **Arthur D. Rainville** at 2415 W. Hellman Ave., Alhambra, Calif. Items to be handled by the West Coast company will be the Foremost plastic scrap grinder, Sarco mold temperature control unit, and Invincible vacuum cleaner for injection molding plants which is capable of picking up oil or water from machines or floor.

J. P. Schwebel & Co., 424 Madison Ave., New York, N. Y., recently formed, will specialize as weavers of industrial glass fabrics for the plastics, electrical, acoustical, and coating fields. The company's weaving mill is in Clifton, N. J.

Bolta Products Sales, Inc., Lawrence, Mass., announces that nylonized Boltaflex has been added to the line of furniture fabrics distributed by **The Shelton Looms Distributing Corp.** This material, the first plastic upholstery ever to be handled by Shelton Looms, is being stocked and distributed through its offices in Boston, Washington, D. C., Seattle, San Francisco, and Los Angeles.

Bolta also announces that **James D. Casey** has been elected to the office of vice president in charge of engineering. Mr. Casey has been affiliated with the company for over 15 years in the Engineering Department.

Godfrey L. Cabot, Inc., has opened a new sales office in Citizens' Bldg., New Brunswick, N. J., for the convenience of its customers in the New Jersey, Delaware, Maryland, Pennsylvania, and Virginia areas. **Bertram A. Wilkes** will head the office.

Sill Industries has announced that its home office is now located at 187 Maplewood Ave., Maplewood, N. J.

Blaw-Knox Construction Co.'s Chemical Plants Div., subsidiary of Blaw-Knox Co., 2023 Farmers Bank Bldg., Pittsburgh, Pa., announces the promotion of **Charles F. Hauck** to assistant sales manager. He will also continue his duties as the division's manager of sales promotion.

Alsynite Co. of America, with plants in San Diego, Calif., and Portsmouth, Ohio, has named **John Berkson** as its new president. Formerly executive vice president of the company, Mr. Berkson retained his interest in Alsynite and served on the board following his resignation from the vice presidency a year ago. Mr. Berkson succeeds **Louis L. Potomac,** who has sold all his Alsynite interests. It was also announced that **W. D. O'Morrow** has returned to Alsynite as sales manager. The company now has production facilities for more than 1,000,000 sq. ft. of Alsynite a month. The main plant is at 4670 De Soto St., San Diego, Calif.

Process Mold Co., 11471 Kercheval Ave., Detroit, Mich., has appointed **Harold L. Donnel** as district representative for sales and engineering in California. His headquarters will be at 4619 Lomita St., Los Angeles, Calif.

General Dyestuff Corp., 435 Hudson St., New York, N. Y., has made the following appointments in its newly-formed Cotton Section: **Larry Thompson,** technical manager, was formerly head of the Mixed Fiber Dept. and is succeeded by **Ulrich Hutten; Tom Walsh,** in charge of the Vat Dept. to succeed **Jack Hennessey** who resigned; **Bert Celentano,** head of the Naphtol Dept.; **Ernie Taylor,** head of the Direct and Sulfur Dept.

Firestone Plastics Co., Pottstown, Pa., announces the following changes in its sales staff: **Charles F. Edelmann,** new manager of Manufacturers' Sheeting Sales, was formerly staff trade manager in the Film Div.; **Edward V. K. Jaycox,** formerly in charge of marketing research, is now manager of Packaging and New Products Sales; **Gurdon H. Smith,** manager of Upholstery Sales, formerly handled the sale of Velon upholstery sheetings in various territories, including the Midwestern and Southeastern areas. **Stuart G. Keiller** will continue as manager of Velon Yarn Sales; **Elmer H. French** will remain as head of the Converting Dept.; and **Thomas A. Henry** will continue to direct sales promotion activities.

Bolta Products Sales, Inc., Lawrence, Mass., has appointed **Paul R. Hofmann** as sales manager for Bolta-Wall plastic wall covering. Mr. Hofmann will be concerned primarily with field operations on a national basis and will make his headquarters in the offices of **Kislik-Brier Assoc.**, 10 W. 33rd St., New York, N. Y., representatives for Bolta-Wall.

MEETINGS

Jan. 15-22—National Housewares Manufacturers Association, Annual Winter Exhibit, Navy Pier, Chicago, Ill.

Feb. 1-4—Western Gift, Toy, and Housewares Show, Western Merchandise Mart and Civic Auditorium, San Francisco, Calif.

Feb. 18-20—Society of the Plastics Industry, Eighth Annual Reinforced Plastics Division Conference, Shoreham Hotel, Washington, D. C.

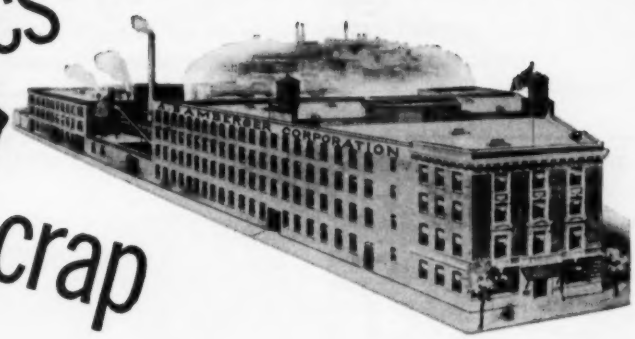
S. P. E. Meetings

Jan. 14—Joint Meeting with Newark Section, Military Park Hotel, Newark, N. J.

Jan. 16—T. A. DeMarco, Monsanto Chemical Co., will address the Buffalo Section on "Glass Fiber Reinforced Styrene."

Jan 21-23—Ninth Annual Technical Conference, Hotel Statler, Boston, Mass.

Plastics Scrap



bought •
sold •
reprocessed •

The world's finest facilities for salvaging plastics scrap and by-products of the plastics industry...

cellulose acetate
butyrate
polystyrene
methyl methacrylate
polyethylene
vinyl
ethyl cellulose
nylon

Vinyl and Polyethylene for
Extrusion • Injection • Calendering

CUSTOM REGRINDING, COMPOUNDING AND RECOLORING...

We specialize in the reduction to small particles — to your most exacting specifications — of all lumps, blocks, mill ends, bleeder waste — regardless of size and whether rigid or soft.

A. BAMBERGER CORPORATION

PLASTICS MATERIALS

703 BEDFORD AVENUE • BROOKLYN 6, N. Y.

PHONE: MAIN 5-7450 • CABLE: CHEMPROD BROOKLYN

Branch Office: 8 East Long Street, Columbus, Ohio • MAin 4877

CLASSIFIED ADVERTISEMENTS

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (used or resale only)

MACHINERY and EQUIPMENT FOR SALE

SAVE WITH GUARANTEED REBUILT EQUIPMENT—RUBBER MIXING MILL, heavy duty 18"x48"; HYDRAULIC PRESSES: 28" x 28", 750 ton, 18" ram. HOBBING, 26"x18", 12" main ram. TRANSFER, 170 tons; 26"x26", 10" ram 118 tons, 24"x26", 16" ram, 116 tons; 26"x26", 10" ram, 200 tons, 36"x26", 8" ram, 75 tons, 18"x18", 8" ram, 75 tons, 10"x24", 10" ram, 75 tons, 12"x12", 6½" ram, 50 tons, 14"x14", 8" ram, 50 tons, 8"x9½", 4½" ram, 20 tons, 16"x16", 3½" ram, 12 tons; LABORATORY PRESSES: Carver, model 156, 10 ton, Buehler 10"x7" 12 ton; NEW UNIVERSAL DUAL PUMPING UNITS: 3 to 15 HP; NEW LABORATORY MILLS & CALENDERS: EXTRUDERS: Royle 2:1 Plastic, insulating type, NRM, 6", strainer type: ACCUMULATOR, HPM 6" ram, 2500#. PREFORM PRESSES all sizes, also Mixers, Vulcanizers, Injection Molding Machines, etc. UNIVERSAL HYDRAULIC MACHINERY CO., INC., 285 Hudson St., New York 13, N.Y.

FOR SALE: Quick delivery Rubber and Plastic Equipment. Farrel 16" x 48", and 15" x 36", 2 roll rubber mills. New 6" x 12" and 6" x 16" Lab. Mixing Mills and Calenders. Other sizes up to 84". Royle #1 to #3 extruders. 200 ton HPM 32" x 56" platens 4 opening. 200 ton Brunswick 21" x 21" Platens. 14" Ram, Record Presses. W.S. 100 ton 24" x 24". Elms 75 ton 36" x 36". Also presses Lab. to 2000 tons from 12" x 12" to 48" x 48". Hydr. Oil Pumps. Gould 75 HP motor Dr. 3 stage Centrif. Pump 250 # W.P. W.S. 4 Pigr. High and low Pressure Hydr. Pump. HPM 5 GPM 2700 lbs. Elmes Hor. 4 Pigr. 4500 lbs. and 5500 lbs. Hydr. Accumulators. Closed Steel ASME Pressure Tank 275 PSI, 1200 gals. Stokes Automatic Molding Presses. Rotary & Single punch Preform Tablet Machines ½" to 3". Injection Molding Machines 1 oz. to 32 oz. Baker Perkins jacketed mixers 100, 50 & 9 gals. Plastic Grinders. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. We buy your surplus machinery. STEIN EQUIPMENT CO., 107 Eighth St., Brooklyn 15, N. Y. Sterling 8-1944.

FOR SALE: One 16 oz. H.P.M. injection molding machine. Can be inspected in operation. Less than three years old. Press in A-1 condition. Reply Box 137, Modern Plastics.

60 OZ. JACKSON & CHURCH with new machine guaranty with capacity up to 100 oz. This is a very fast machine—$40,000. 12 oz. Lester 1943 with extra cylinder—$10,000, good condition. 8 oz. DeMattia toggle type—$8500. 6 oz. Lester — $3500. 16 oz. Special Fast machine, proven—$19,500. ACME MACHINERY & MFG. CO., 102 Grove St., Worcester, Mass.

WE HANDLE HYDRAULIC PRESSES, pumps, and power units of all sizes. Write us your requirements and we will try to help you. We find it impossible to list our equipment in this classified column due to the fact that the equipment is sold before ad is published. For those who seek action look in the New York Times under the Machinery and Tool Column for our regular Sunday Special. HYDRAULIC SAL-PRESS, INC., 396-90 Warren Street, Brooklyn 2, N. Y. MAin 4-7847.

FOR SALE: 1—Farrell 20" x 48" Plastic Mill, m.d.; 1—Farrell-Birmingham self-contained 6" x 13" 3-roll vertical Calender, m.d.; 1—Royle 2" oil heated Plastics Extruder; 1—Baldwin 200 ton Molding Press; 1—Colton #5½ Preform Press. Also Grinders, Extruders, Compression and Injection Molding Presses, Mixers, etc. Send us your inquiries. We buy your Idle Equipment. CONSOLIDATED PRODUCTS CO., 13-14 Park Row, New York 38, N. Y. BArclay 7-0600.

FOR SALE: DPI VACUUM COATING MACHINE, double 18" glass bells, year and a half old, only slightly used. Reply Box 108, Modern Plastics.

FOR SALE: 28 Ton WS 18" x 18" Platen, 50 Ton PRESS 20" x 20" PL, 75 Ton ADAMSON PRESS 20" x 20" PL, 75 Ton WS 15" x 15" PL, 140 Ton WS 23" x 17" PL, 150 Ton HPM Triple Action 36" x 36" PL 175 Ton HPM 30" x 30", 225 Ton WS 28" x 24", 300 Ton WS 20" x 20", 300 Ton WS 24" x 29" Platen. 8-oz. WS, 9-oz. HPM, 4 oz. DeMattia Injection Molding Machines. Accumulators, Laboratory Presses, Pistons & Oil Pumps, Pulverizers, Scrap Cutters, Grinders, Ball & Jewell. Cumberland. AARON MACHINERY CO., INC., 45 Crosby St., New York 12, N. Y. WOrth 4-8233.

FOR SALE: Two 1-oz. Power Operated Van Dorn injection molding presses; now in operation and open for inspection. ARTHUR FRISCH CO., 15-17 East 16th St., New York 3, N. Y.

PUMP FOR SALE

Gould Triplex Pump, Size 2 x 8, Fig. 1841. Maximum pressure 4000 psi. Capacity 24 gpm. Will include 40 HP Motor and V Belt Drive if desired. All in Excellent Condition

DIEMOLDING CORPORATION
Canastota, New York

FOR SALE 12 oz. Lester Injection Press complete with instruments, in good condition, can be seen running. Bought new 1946. PRICE $10,000. KNICKERBOCKER PLASTIC CO., 4101 San Fernando Rd., Glendale 4, Calif.

FOR SALE: 1—Ball & Jewell No. 1½ Rotary Cutter, stainless steel. 4—Mikro Pulverizers #1-SH, #1-SI, #2-SI, #2-TH. 2—Kux Rotary Pellet Presses. 4—Stokes D-3 Rotary Pellet Presses. Read 600 gallon Jacketed Ribbon Mixer. Large stock Stainless Steel Tanks and Kettles. PERRY EQUIPMENT CORP., 1429 N. 6th St., Phila. 22, Pa.

FOR SALE BY INJECTION FIRM, 8 Reed and Watson presses, six to sixteen ounce. Reply Box 119, Modern Plastics.

FOR SALE: Reinforced plastics press 54" x 144". INJECTION PRESSES: 6 oz. Reed w. 8 oz. cyl., 4, 9 oz. HPM, 16 oz. Lester. 22 oz. Impco VF 822. 1 oz. Van Dorn. EXTRUDERS: 3½" NRM, Royle No. 1 Wire cov. setup. Scrap grinders. Ovens. Honan oil filter No. 24. Transfer & compression presses. 3, 12 & 50 ton Lab presses. Preform presses: Colton E, Stokes T, Kux 25, Sheridan Emboss. press No. 9. 42" Slitt. & rewind. Mach. 7½ HP Rel. Varidrive. 3 HP Gas Boilers. List your surplus equipment with me for prompt action. JUSTIN ZENNER, 823 Waveland Ave., Chicago 13, Ill.

FOR SALE AT TREMENDOUS SAVINGS: Colton 2 and 3 RP Rotary Tablet Machines. Mikro 1SE, 2TH, 4TH Pulverizers; Jay Bee and Schutz O'Neill Mills. Baker Perkins & Readco Heavy Duty Steam Jacketed, Double Arm 50, 100, 150 gal. Mixers. Baker Perkins 150 gal. D. A. Unidor Jacketed Mixer. Baker Perkins 100 gal. D. A. Vacuum Mixers. J. H. Day from 8 up to 75 gal. Imperial and Cincinnatus D. A. Jacketed Sigma Blade Mixers. Day & Robinson 100 up to 4000 lbs. Dry Powder Mixers. Pony ML and M Labelrites. Package Machy. FA, FA4, Miller, Hayssen 3-7, Scandia auto. Wrappers. Hudson Sharp Campbell auto cellophane Wrapper. REBUILT AND GUARANTEED. This is only a partial list. Over 5000 machines in stock—available for immediate delivery. Tell us your machinery requirements. UNION STANDARD EQUIPMENT CO., 318-322 Lafayette St., New York 12, N. Y.

FOR SALE: One 16 oz. Watson-Stillman 1950 model in excellent condition, $21,000, and one 12 oz. Watson-Stillman 1946 model, injection molding machines. The 12 oz. completely reconditioned. New cylinder, less than three mo. old. New pump, 4 months. In perfect condition, $14,500. Operating daily, can be seen. Plenty of spare parts and nozzels. Reply Box 118, Modern Plastics.

AVAILABLE: Injec. mold. mchnes—all sizes; let us know your requirements; 4-oz. vert. #1V4 Lester-Phoenix; $4950; 60-oz. Jackson Church—can be seen oper. Offers. Presses—5 late type French Oil 530 Tons plastic; bed size 54" x 30", 30" rams; new platens; self-contained; cost new $20,000. . . . $9950 each. EVEREADY SUPPLY—805 Housatonic Ave., Bridgeport, Connecticut 4-9471.

FOR SALE: One 16 oz. H.P.M. injection molding machine. 1947 model, in excelent condition Can be seen in operation. Attractive price. Reply Box 125, Modern Plastics.

FOR SALE: Industrial X-ray Unit. 195-245 volts, single phase induction, 60 cycle a.c. motor. Variable speed conveyor, 10-30 feet per minute with ½ HP, 60-cycle a.c. motor. Built in 12 x 16 inch viewing screen. Used to inspect finished products for defects and determination of metallic contamination. FRANKLIN JEFFREY CORP., 1671 McDonald Ave., Brooklyn, N. Y. Es. 5-7943.

MACHINERY and EQUIPMENT WANTED

WANTED: Plastics and Rubber Processing Machinery including Banbury Mixers, Heavy Duty mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set up plant now operating or shut down. When offering give full particulars. P.O. Box 1351, Church Street Sta., New York 8 N. Y.

WANTED: Plastic injection moulding machines. Get our offer before you sell. ACME MACHINERY & MFG CO., 102 Grove St., Worcester, Mass.

PEERLESS IMPRINTING MACHINE or similar equipment wanted, preferably with chain type feed. Please state Model, age, condition, and price. Reply to Box 113, Modern Plastics.

WANTED: #3 Banbury Mixer and a 4½"-6" Plastic Extruder. FRANKLIN JEFFREY CORP., 1671 McDonald Ave., Brooklyn, N. Y. Es. 5-7943.

WANTED

8 oz. Reed Prentice, Fellows or Lester post war model—condition immaterial if priced accordingly.

Reply Box 138, Modern Plastics

WANTED — WANTED — WANTED — Lester-Phoenix, Reeds, Watson Stillman, and other injection molding machines, all capacities 16-or-22-oz. cylinder for 22-oz. Impco machine. WANTED — scrap grinders, extruders, hydraulic presses, pumps, complete plastic plants, etc. SUPERIOR MACHINE TOOL—803 Housatonic Avenue, Bridgeport, Connecticut Tel. 4-9471.

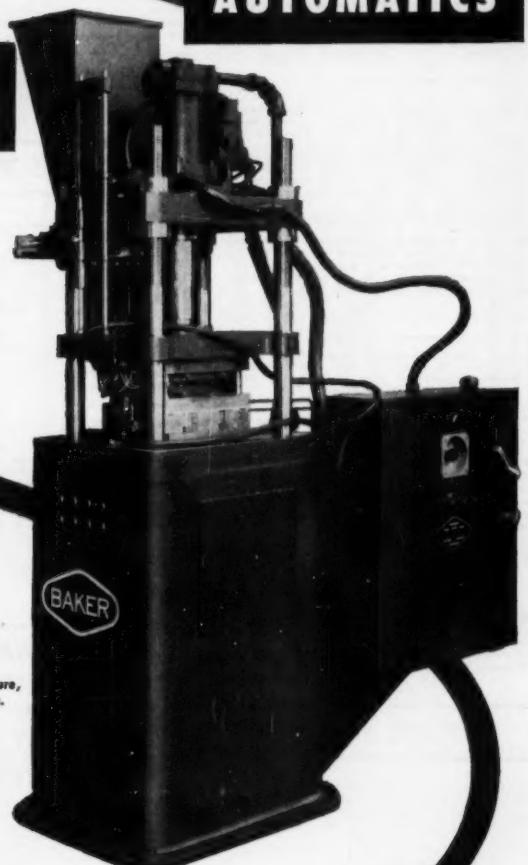
WANTED—12 ounce DeMattia or 16 ounce Reed-Prentice Injection Machines. Advise full particulars. Box 146, Modern Plastics.

(Continued on page 214)

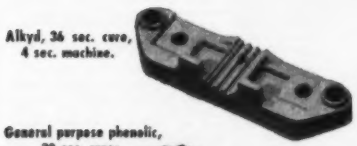
SPEED with BAKER AUTOMATICS

Up to 2400 pieces per hour with 8 cavities . . .

- HIGH SPEED
- SELF CONTAINED
- LOWER MAINTENANCE
- HIGH PRODUCTION RATE
- ONE MAN CAN RUN A BATTERY OF 10



Check these production figures . . .


Alkyd, 36 sec. cure, 4 sec. machine.

Alkyd, 30 sec. cure, 4 sec. machine.

General purpose phenolic, 30 sec. cure; 10 sec. machine.

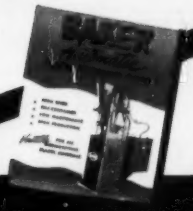
Beetle, 34 sec. cure, 8 sec. machine.

Alkyd, 14 sec. cure, 4 sec. machine.

Bakelite, 60 sec. cure, 10 sec. machine. plus insert.

Alkyd, 9 sec. cure, 4 sec. machine.

Then write for catalog and full details . .



Better Machine Tools . . . Since 1867

BAKER BROTHERS, Inc., TOLEDO, OHIO

CLASSIFIED ADVERTISING

(Continued from page 212)

PLANTS FOR SALE

FOR SALE: Complete solvent recovery plant, fully automatic, two adsorber activated carbon system, fans, motors, pumps, condenser, control panel, cylinder operated valves, 16,000 cfm. Used for recovery of hydrocarbon type solvents. This Carbide and Carbon unit available for inspection. Detailed summary upon request. VULCAN RUBBER PRODUCTS, INC., 1st Avenue and 58th Street, Brooklyn 20, New York. Telephone—GEDNEY 9-8000. Contact J. Quigley.

FOR SALE: Complete plant and equipment of a Plastic Moulding Company, (Compression Moulding), consisting of: Modern Toolroom Machinery, Presses, Pumps, Accumulators, and all the necessary ancillary equipment, also included are a LARGE NUMBER OF MOULDING TOOLS, which are for the production of Household Articles, Smoker's Sundries, Fancy Goods, Games, and Toys, etc. The complete plant etc., can be inspected in operation in England, and can be readily shipped overseas as a self-contained unit, which can be put into prompt production. Prepared to sell all the MOULDING TOOLS as a separate item. Interested principles only with the necessary references, write: Box 103, Modern Plastics.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 107, Modern Plastics.

FOR SALE OR LEASE—PENNA FACTORY BUILDING (80 miles from New York)—17,000 sq. ft. one story brick building 16 ft. ceiling. Concrete and asphalt floor. Plenty of water—oil heat. Heavy duty electric lines. Windows on all sides. Large entrance doors for admittance of trailer trucks. 3½ acres land. No restrictions. Plenty labor. HERMAN PERLA, INC., Stroudsburg, Pa.

SMALL COMPRESSION MOLDING FACTORY complete with land, building and equipment. Some tool room equipment. Located in New England. Operating at present. Reply Box 128, Modern Plastics.

PLANTS WANTED

WANTED: PLASTICS INJECTION MOLDING PLANT or individual machines—Reeds, Impco, Louters, Fellows. Send us details. TUPPER CORPORATION, Farmamsville, Mass.

WE ARE MANUFACTURERS OF CONSUMER PRODUCTS interested in purchasing outright a small to medium sized Injection Molding Plant, with either proprietary, custom or combination of both types of operation We are the principles, ready to act quickly. Submit full details in the strictest confidence. Box 134, Modern Plastics.

INJECTION MOLDING PLANT WANTED or will consider partnership. Will furnish all technical knowledge. Reply Box 143, Modern Plastics.

MATERIALS FOR SALE

FOR SALE: 3000 pounds Flesh and Pink Butyrate Molding Powder, reground 25 cents per pound. Reply Box 100, Modern Plastics.

MACHINED ACRYLIC BLOCKS 15,000 LBS.

1¾ x1¾ x 2 x 6	15¢ lb.
1¾ x 6 x 7	25¢ lb.
2½ x 8 x 9	30¢ lb.

AIRMATE CO., 1150 Nebraska Ave., Toledo, O.

STYRENE, HIGH IMPACT, White Reground, 5,000 lbs. per month. Also spot lots of Reground Virgin Cellulose Acetate, Butyrate & Ethyl Cellulose. CLAUDE P. BAMBERGER, INC., 152 Centre St., Brooklyn 31, N. Y., Tel. Main 5-5553. Not connected with any other firm of similar name.

FOR SALE—Plastisole scrap. 40 tons, priced to clear. Vinyl .020 gauge in solid colors. Also graded vinyl scrap in mixed prints and graded colors. Any particular color supplied. Reply Box 131, Modern Plastics.

PLASKON MELAMINE—3,000 lbs. in slightly damaged drums. Coral, blue, green. One third off list, delivered. Send for sample. Box 133, Modern Plastics.

MATERIALS WANTED

WANTED: Plastic scrap such as Cellulose Acetate, Vinyls, Acrylic, Ethyl Cellulose, Polystyrene, Butyrate, etc. We also buy surplus inventories of molding powder or grind, clean and reprocess your own scrap. CLAUDE P. BAMBERGER, INC., 152 Centre St., Brooklyn 31, N. Y., Tel. Main 5-5553. Not connected with with any other firm of similar name.

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic, Ethyl Cellulose. Reply Box 105, Modern Plastics.

WANTED: PLASTIC Scrap or Rejects in any form. Acetate Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 106, Modern Plastics.

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene, Butyrate. Custom grinding, magnetizing, compounding, and straining of contaminated plastics. FRANKLIN JEFFREY CORPORATION, 1671 McDonald Avenue, Brooklyn, N. Y., ES 5-7943.

MOLDS WANTED

WANTED: BOXES, BOXES—Molded Boxes or Box Molds: We have thousands of clients who are seeking molded Styrene Boxes for packaging. List and send sample of each type box you have available. BRADLEY ASSOCIATES, INC., "world's largest source for molded plastic boxes"—1653 N. Damen Ave., Chicago, Ill.

MOLD WANTED for injection molding. We will buy one mold or a complete line or series of molds for finished resaleable items. Housewares, toys, novelties, etc. Will also buy molds for industrial parts such as handles, knobs, drawer pulls, gears. All items for resale in U. S. A. Send detailed information to VICTORY MANUFACTURING COMPANY, 1722 W. Arcade Place, Chicago 12, Illinois.

WANTED INJECTION MOLDS ON PIGGY BANKS, salt and pepper shakers, letter openers, 6" and 12" rulers for advertising premium field. Contact Box 117, Modern Plastics.

WANTED FOR EXPORT—Molds of outmoded novelty items on rental or outright purchase—machines eight ounces or less. Polystyrene and acetate. Submit catalogue or photos of items and if possible samples. Reply Box 130, Modern Plastics.

BRUSH MOLDS AND BRUSH MACHINERY—Injection molds for ladies', men's, military, nail, tooth brushes, etc. Send particulars and samples. Reply Box 759, Realservice, 110 W. 34 St., New York, N. Y.

MOLDS FOR SALE

FOR SALE—very cheap—2 molds for injection molding: One for a one-quart flask. One for a automobile tail light reflector assembly. NOFOR, 115 rue du Temple, Paris (France).

FOR SALE: Injection molds to produce fast-moving line lamp parts,—bases, inserts, caps, bowls, etc. Very special price for entire lot. Catalog on request. SUPERIOR PLASTICS, INC., 426 North Oakley Boulevard, Chicago 12.

HELP WANTED

DEVELOPMENT—SERVICE—As a result of Emery's expansion program in the plasticizer field, an outstanding and challenging position is available for a qualified man in our Development-Service Department to perform: Product Development, Sales Development, Customer Service. Position requires chemistry degree and 3-5 years industrial experience in the fields of plasticizers for vinyls, synthetic rubbers, and resins. CINCINNATI LOCATION, straight salary plus incentive bonus, other liberal employee benefit plans. Apply EMERY INDUSTRIES, INC., 4206 Carew Tower, Cincinnati, Ohio.

WANTED: CHEMIST WITH KNOWLEDGE OF THERMOSETTING PHENOLIC, urea and polyester resins for Sales Work in Eastern Sales Office of large resin manufacturer. Write giving age, educational background and industrial experience, salary requirements, etc. Also, send recent photo. Reply Box 104, Modern Plastics.

INJECTION MOLDING SUPERVISOR—One of the largest molding plants in the country located in the New York area offers an unusual opportunity for a top flight man thoroughly experienced in all phases of injection molding operations. Must be capable of taking complete charge of large molding room with machines of all sizes. Liberal salary and bonus for the right man. Reply Box 111, Modern Plastics.

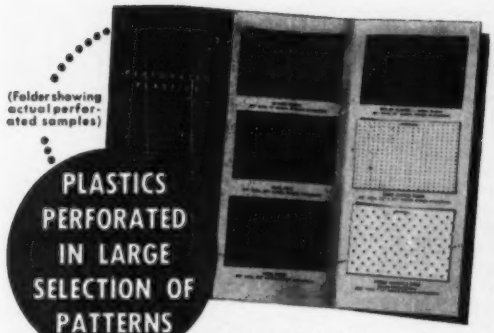
CHEMICAL ENGINEER wanted by Midwestern manufacturer. Master's degree, must have not less than two years research experience in addition to experience with resins and organic finishes. Supervisory and administrative experience desirable. Age 25 to 35 preferred. Reply stating background, qualifications and salary expected. Reply Box 114, Modern Plastics.

PLASTICS TECHNICIAN—Experience with properties of various plastics, capable complete plastic testing. Individual we seek may presently be employed as technical service representative on flexible or rigid plastics, degree preferred but not necessary. This opening exists in Nationally known company, Northern New Jersey. Write in confidence giving age, education, past experience, salaries. Box MP 1494, 321 W. 41 St., New York, N. Y.

ENGINEER — SENIOR — MOLDING — M. E. graduate or equivalent in experience, capable of taking full responsibility for development in processes involving plastic compression and injection molding. Will be attached to Engineering Department of medium sized firm engaged in production of electronic components. Report directly to Chief Mechanical Engineer. Several years' background in research and development plus production experience or design experience in automatic molding equipment desirable. Reply fully to E-8, P. O. Box 3495, Phila. 22, Pa.

SALES REPRESENTATIVE WANTED by an expanding, aggressive, southern custom injection molder. Past experience in plastics preferred. We will back you up with an excellent design, engineering and production service and competitive prices, as well as with advertising and promotional campaigns. Liberal commissions plus attractive incentive bonus. Territories available in New England, Middle Atlantic, Southern, Mid-Western and Western States, Pittsburgh and Louisville areas. Excellent opportunity for men who can sell. Tell us what lines you are presently carrying and give complete details of your past experience. Write Box 120, Modern Plastics.

(Continued on page 216)



(Folder showing actual perforated samples)

PLASTICS PERFORATED IN LARGE SELECTION OF PATTERNS

Perforating of plastics is one of our specialties. We have satisfied many purposes with the perforating of such materials as paper, vulcanized fibre, hardboard, vinyl film sheeting and coated fabrics, cellulose acetate, cellulose nitrates, polyethylene, polystyrene, etc. Our 69 years of specialized perforating experience has built an unlimited choice of patterns from which you can choose, ranging upward in hole size from 1/50" diameter, spaced close or far apart. We suggest that you submit a sample of your material with your inquiry and advise—

1. Size, shape and spacing of perforations wanted.
2. Sheet size, or roll width, of stock to be supplied.
3. Quantity involved.

We invite you to consult our engineering department for recommendations. Ask for Catalog No. 62 for selection of patterns.

THE Harrington & King PERFORATING Co

5690 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N. Y.

• WOLOCH VINYL • WOLOCH POLYETHYLENE • WOLOCH POLYSTYRENE • WOLOCH VINYL • WOLOCH POLYETHYLENE • WOLOCH POLYSTYRENE • WOLOCH VINYL • WOLOCH POLYETHYLENE •

ALL PLASTICS

bought sold reprocessed

virgin and scrap

WOLOCH supplies the materials you need at rock-bottom prices

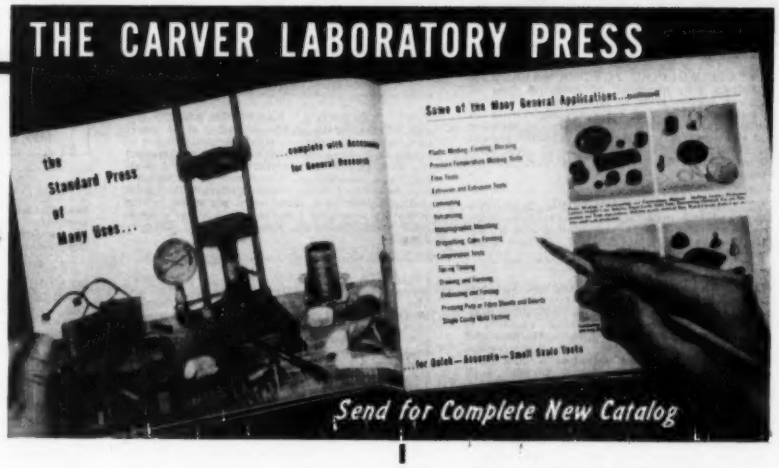
WOLOCH converts your scrap or surplus supplies into spot cash

GEORGE WOLOCH PRODUCTS CORP.

82 Beaver Street, New York 5, N. Y. • HAnover 2-1171

Every day more and more people say: we like to do business with WOLOCH

THE CARVER LABORATORY PRESS


the Standard Press of Many Uses...
...complete with Accessories for General Research
Some of the Many General Applications...continued
for Quick—Accurate—Small Scale Tests
Send for Complete New Catalog

SOME OF ITS MANY USES IN *Plastics Laboratories*

Testing single-cavity molds
Molding color samples.
Production of samples.
Plastics instruction and demonstration.
Metallographic mounting.
Metal insert mold tests.
Vulcanizing.
Drawing.
Forming.
Embossing.
Bonding plywood.
Testing tensile properties.
Testing compressive properties.
Testing shear strength.
Flow tests.
Crushing tests.
Breaking tests.
Determining heat cycles.

Send for your copy of this new handy-size manual containing up-to-date information on the Carver Laboratory Press and its many uses.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
3 CHATHAM ROAD, SUMMIT, N. J.

Send catalog, describing Carver Laboratory Press and Standard Accessories.

NAME .....

FIRM .....

ADDRESS 22

CLASSIFIED ADVERTISING

(Continued from page 214)

EXTRUSION COMPOUNDING AND COLORING SUPERINTENDENT required by large New York area molding plant. Excellent opportunity for man thoroughly experienced coloring, blending and compounding all injection molding materials by extrusion method. Must be capable of taking complete charge of equipment, personnel and methods. Reply Box 121, Modern Plastics.

DEVELOPMENT ENGINEER—Small active concern needs technician to develop manufacturing processes for products entailing forming and casting of thermo-setting materials. Our sales results are exceeding current ability to produce and develop new products. Good opportunity for capable and imaginative person. Plant located Long Island, New York. Please give full information: age, experience and salary desired. Write Box 126, Modern Plastics.

TECHNICAL PLASTICS SALES—Experienced man needed for newly formed progressive chemical-plastics sales concern. Excellent opportunity. Should be technically proficient but primarily interested in sales work. Knowledge of thermo-plastic fabrication helpful. Some traveling involved. Send resume of experience, personal data, training and salary requirements. Reply Box 129, Modern Plastics.

WANTED — EXPERIENCED EXTRUSION MAN capable of handling projects through development and production. Merely an extruder operator not wanted, only one who can direct and help on necessary setups need apply. To locate in Eastern Pennsylvania. In reply please send resume of experience, training and salary requirements. Reply Box 132, Modern Plastics.

WANTED—PLASTICS EXTRUSION MAN to take full charge of production in a small plant located in the metropolitan New Jersey area, within easy commuting distance of NYC. Should have knowledge of die design. Compounding experience helpful but not necessary. Reply in full citing experience and salary desired. All replies confidential. Excellent opportunity for the right man. Reply Box 135, Modern Plastics.

ACETATE MOLDING POWDER SALESMAN—Medium size producer of complete line of cellulose acetate molding powder wants aggressive salesman having 3-5 years experience in similar work. Knowledge of injection molding and extrusion. Attractive financial arrangement for right man. Metropolitan N. Y. area. Give all details in first letter. Box 139, Modern Plastics.

TOY DESIGNER AND MODEL MAKER—Large plastic and metal toy manufacturer wishes services toy designer and model maker full time basis. Write Box 145, Modern Plastics.

WELL ESTABLISHED Midwestern Proprietary molder has openings for two men in expanding operations. PRESS ROOM PRODUCTION FOREMAN—This opening requires a man with experience in both thermosetting and thermoplastic fabrication; both compression and injection. Opening demands a man with know-how and ability to follow through both actual production and related projects. Would be responsible for efficient operation and results of press room on three shift basis. Extrusion experience would be desirable but not essential. Salary open. PLASTIC PLANT CHEMIST—This opening requires a young chemical engineer with several years experience on both production and laboratory evaluation of plastic materials. Should be capable of supervising the production of molding powders in both thermosetting and thermoplastic types—also maintaining inventories and ordering a large variety and tonnage of plastic materials per month. Experience in extrusion work desirable but not absolutely necessary. Salary open. Send complete details and work record with first application. Reply Box 101, Modern Plastics.

PLASTIC MOLDING SUPERVISOR — Well established injection molder in Jersey Metropolitan area has opening for complete charge molding department supervisor. Thorough knowledge of machines and materials required. Permanent position with good salary. State age, experience, etc., and earnings expected. Reply Box 147, Modern Plastics.

INJECTION PRODUCTION MANAGER

Man wanted by large plastics company to manage injection department. Must be thoroughly trained in all phases of injection molding including mold design. Must have production ability. Excellent opportunity in long established company for man with experience. Write giving your qualifications and salary requirement.

Box 140, Modern Plastics.

SALES ENGINEER OR MANUFACTURERS REPRESENTATIVE to handle top notch expanding line of molding materials in area surrounding Philadelphia. Other territories also open. Knowledge and experience in reinforced plastics molding desirable but not essential. Excellent opportunity in a rapidly growing field. Your reply stating complete background, qualifications and salary desired will be considered confidential. Box 141, Modern Plastics.

SITUATIONS WANTED

GERMAN BUSINESSMAN, 32, stable position, seeks change, preferably on sales side or to help firm wishing to establish itself in Germany. Expert in the plastic field (PVC, Polyethylene, synthetic fibres). Versatile, reliable, hard worker. From Jan. 1st or later. Reply Box 109, Modern Plastics.

EXECUTIVE AVAILABLE. Consultant development chemist, engineer. 15 years diversified experience. Graduate chemist and engineer. Responsible technical practical business experience and sales engineer. Well versed production technique. New products and process development particularly low pressure laminates. Development supervisor and designing production, equipment, formulae and process of fabrication methods, including hollow fibre glass fishing rods, etc. Will consider offering services as consultant or permanent basis. Reply Box 110, Modern Plastics.

MANUFACTURER'S AGENT selling castings, would like to take on an additional line and represent a well-established plastic molding corporation in the middle west territory. Reply Box 116, Modern Plastics.

VINYL TECHNICAL SALES OR SERVICE—Age 34. University graduate. Offer seven years experience all phases vinyl formulating and processing. Thoroughly familiar with calendering film and sheeting, plastisol-organisol coating, and extruding. Considerable experience outside contact work. Desire sales position mfg. resins, plasticizers, stabilisers, pigments, where extensive practical knowledge customer's problems would be asset. Reply Box 122, Modern Plastics.

PLASTICS ENGINEER with a chemical engineering degree. Polyethylene film extrusion and film embossing background. Practical production and supervisory experience, and have done development work on production equipment. Experience also includes take-up, and auxiliary equipment design. Excellent references. Desire a permanent position in development or production with a progressive organization. Young, ambitious, hard worker. Family. Will relocate. Box 123, Modern Plastics.

CHEMICAL EXECUTIVE—polymer expert, Ph. D., 37, with industrial background in plastics, adhesives, coatings, paper, textiles. Record of successful new product development, quality improvement, and plant cost reduction. Presently employed in the metropolitan New York area. Reply Box 136, Modern Plastics.

CHEMIST—MAKES PLASTIC DECORATING EASIER—One who can do his job seeks permanent connection. 13 yrs. diversified experience. Presently responsible for coatings, adhesives used on acrylics, polystyrenes, acetates, silicones. Intimate knowledge of sheet stock printing- fabricating, production techniques, product and process development, chemical-mechanical trouble-shooting, testing, chemical analysis. Age 35. Married. Prefer Chicago area. Reply Box 134, Modern Plastics.

CHEMICAL EXECUTIVE—polymer expert, Ph. D., 37, with industrial background in plastics, adhesives, coatings, paper, textiles. Record of successful new product development, quality improvement, and plant cost reduction. Presently employed in the metropolitan New York area. Reply Box 136, Modern Plastics.

EXECUTIVE TYPE-SALES ENGINEER: 8 years experience in custom molded, blown, and extruded plastics. College graduate, age 38. Now serving as manufacturer's representative in Metropolitan New York-New Jersey area with excellent contacts—most known accounts and personnel. Can devote time to one other line. Draw against commission. Reply Box 144, Modern Plastics.

MISCELLANEOUS

WANTED PLATE SCRAPER HANDLES
Prominent manufacturer seeks supplier with necessary molds for producing polystyrene plate scraper handles. Will purchase substantial quantities of handles, but is not interested in purchasing any molds. Reply at once Box 112, Modern Plastics.

WANTED: A company with facilities for making a high pressure laminate using our formulation. The maximum size would be 48" x 120". Reply Box 115, Modern Plastics.

TOY LINES OR ITEMS WANTED
Our clients are experienced toy representatives. They are young, active and progressive road salesmen with 15 years of buyer contacts with Jobbers, Chains, and Department Stores in New England, N. Y. State, Pa., N. J., Del., Md., Wash., D. C., Ohio, Mich., Indiana, with permanent showrooms at the Toy Center, 200 5th Ave., N. Y.
MARTIN POLLACK ADVERTISING
1225 Broadway, New York 1, N. Y.

I AM INTERESTED IN CONTACTING molders, extruders and calenderers to finance their accounts receivable. Advantageous terms. Reply in strictest confidence to Box 127, Modern Plastics.

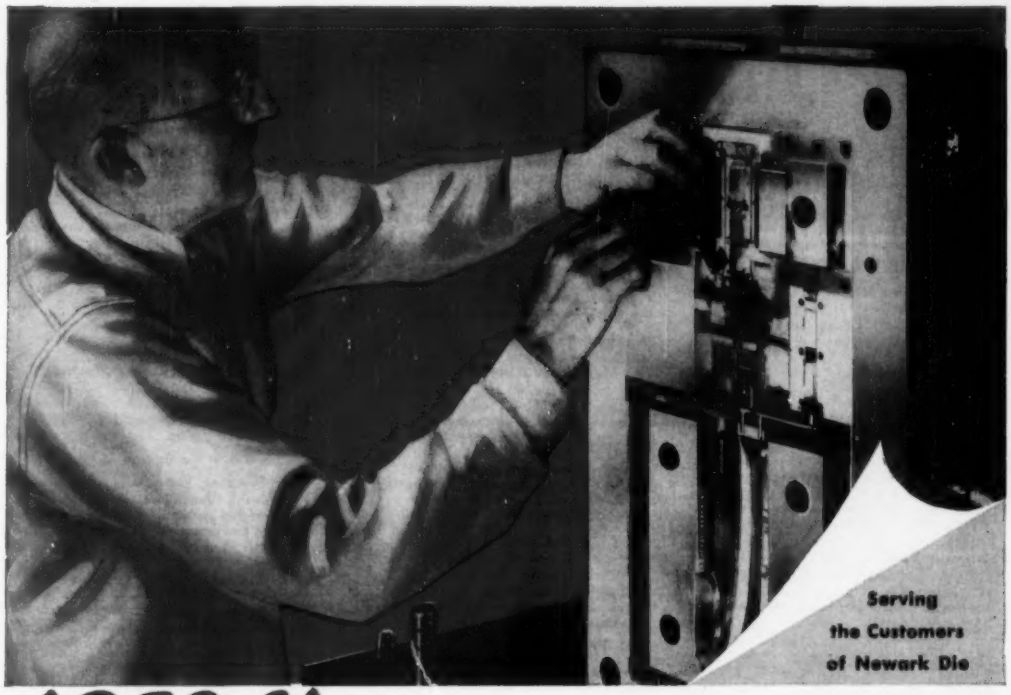
IF YOU HAVE STOCK MOLDS OF HOUSEWARES, Toys, Notions, Novelties or Specialties, I can market your entire production to large Chain Stores, Department Stores and Jobbers on commission basis. Also interested to buy injection molds, above items, on royalty or outright purchase. Would consider small investment in going plant plus my services in promoting sales. Give full details. Reply Box 102, Modern Plastics.

ATTENTION MOLDERS: We are interested in financing compression and injection molders who want to develop new ideas or new products by our furnishing the molds free of charge against profit participation in the products developed thereof. Please write to Box 142, Modern Plastics.

All classified advertisements payable in advance of publication
Closing date: 5th of preceding month; e.g., January 5th for February issue

Up to 60 words.....$13.00	Up to 120 words.....$20.00	Up to 180 words.....$30.00
Up to 60 words (boxed)..$20.00	Up to 120 words (boxed)..$40.00	Up to 180 words (boxed)..$60.00

For further information address Classified Advertising Department,
Modern Plastics, 575 Madison Avenue, N. Y. 22, N. Y.



1,259 Years OF ACCUMULATED SKILL*
GO INTO MAKING MOLDS LIKE THIS

OVER 50%* OF THE PERSONNEL
of Newark Die have been designing and making precision molds for 15 years or more

Making the plastic *molds* that produce accurately sized plastic *parts* is a job that calls for the specialized knowledge gained *only* through years of experience.

Here at Newark Die, molds are designed by engineers with many a year of experience—built by seasoned craftsmen operating the most modern machine tools. This men-and-machines combination brings you the precision molds that meet your most exacting requirements!

That's the through-the-years story of Newark Die. Just a few months ago, we enlarged and rearranged our mold-making facilities to permit us to serve our customers more promptly—and to maintain and strengthen our position as leaders in the field of precision molds.

NEWARK DIE COMPANY
22 SCOTT STREET, NEWARK 2, N. J.
Phone: MArket 2-3305

NDCO TRADE MARK

INDEX OF ADVERTISERS

JANUARY 1953

Accurate Molding Corporation .. 154
Acromark Company, The 192
Adamson United Company 126, 127
Aetna-Standard Engineering Company, The 189
American Cyanamid Company, Plastics Department 91
American Insulator Corporation 54
American Molding Powder & Chemical Corp. 173
Apex Machine Mfg. Corp. 136
Atlas Electric Devices Company .. 176
Auburn Button Works, Inc. 199
Avery Adhesive Label Corp. 171

Bailey, R. N., Co., Inc. 182
Bakelite Company, A Division of Union Carbide and Carbon Corporation .. 125, Inside Back Cover
Baker Brothers, Inc. 213
Ball & Jewell, Inc. 16
Bamberger, A., Corporation 211
Better Homes and Gardens 42
Black-Clawson Co., Inc., The, Dilts Machine Works Division 18
Bolling, Stewart, & Company, Inc. 181
Boonton Molding Co. 105
Boston Woven Hose & Rubber Company 96, 97
Bridgeport Moulded Products, Inc. 28
Buttondex Corp. 186

Cabot, Godfrey L., Inc., Plasticizer Division 117
Cadillac Plastic Company 175
Cambridge Instrument Co., Inc. 138
Cameron Machine Company 36
Carbide and Carbon Chemicals Company, A Division of Union Carbide and Carbon Corporation 101
Carver, Fred S. Inc. 215
Catalin Corporation of America .. 1
Celanese Corporation of America, Transparent Films Dept. 9
Chicago Molded Products Corp... 4
Classified 212, 214, 216
Consolidated Molded Products Corporation 174
Crucible Steel Co. of America .. 203
Cruver Manufacturing Company. 41
Cumberland Engineering Company Inc. 31

Diamond Alkali Company 10
Dilts Machine Works, Division of The Black-Clawson Co., Inc. .. 18
Dowding & Doll Ltd. 135
du Pont de Nemours, E. I., & Co. (Inc.)
Grasselli Chemicals Dept. .. 185
Polychemicals Department 7
Durez Plastics & Chemicals, Inc. Inside Front Cover

Eagle Tool and Machine Co. 181
Eastman Kodak Company, Cellulose Products Division 119
Emery Industries, Inc. 30
Erie Resistor Corporation 49
Ever Ready Label Corp. 179

Fabricon Products, Inc., Plastics Division 154
Farrel-Birmingham Company, Inc. 46, 47
Federal Tool Corporation 176
Federal Telephone & Radio Corp. 29
Fellows Gear Shaper Co., The .. 163
Ferro Corporation, Fiber Glass Division 161
Fiore, Wm. M., Inc. 26
Firestone Plastics Co., Chemical Sales Division 50, 51
Flexfirm Products 193

Geissel Mfg. Co., Inc. 168
General Electric Co. 169, Back Cover
Gering Products, Inc. 153
Girdler Corporation, The 155
Goodrich, B. F., Chemical Co., The 3
Goodyear Tire & Rubber Company, The, Chemical Division 27
Gries Reproducer Corporation .. 188

Hale and Kullgren Inc. 189
Hardesty Chemical Company, Inc. 170
Harrington & King Perforating Co., The 215
Harvey, Guy P., & Son, Corp. .. 137
Hercules Powder Company .. 32, 33
Heyden Chemical Corporation .. 207
Hinde & Dauch 165
Hobbs Manufacturing Co. 190
Hooker Electrochemical Company 45
Hyatt Award, The John Wesley .. 43
Hydraulic Press Mfg. Co., The .. 21

Ideal Plastics Corporation 11
Imperial Chemical Industries Ltd. 20
Industrial Heater Co., Inc. 144
Industrial Mfg. Corp. 157
Industrial Research Laboratories 194
International Textile Co. 186

J. B. Products Co. 159

Kellogg, M. W., Company, The .. 209
Kentucky Color & Chemical Co. 196
Kingsley Stamping Machine Co. 149
Kleemann, O. & M., Ltd. 121
Koppers Company, Inc. 143
Kurz-Kasch, Inc. 17

Lane, J. H., & Co., Inc. 160
Lembo Machine Works, Inc. 164
Lester-Phoenix, Inc. 52
Lewis Welding & Engineering Corporation, The 39
Liberty Machine Co., Inc. 156
Lind Plastic Products Co. 164
Lor-El Company 194

Manco Products, Inc. 196
Manufacturers' Literature .. 171, 172
Marblette Corporation 110
Mayflower Electronic Devices, Inc. 179
Mearl Corporation, The 182
Meredith Publishing Co. 42
Metalsmiths, Div. of Orange Roller Bearing Co., Inc. 174
Metaplast Process, Inc. 132
Metasap Chemical Co. 166
Michigan Chrome & Chemical Company 180
Michigan Molded Plastics, Inc. .. 130
Midland Die & Engraving Company 86
Mills, Elmer E., Corporation 37
Mitts & Merrill 148
Modern Plastic Machinery Corp. 13
Molded Products Corporation .. 38
Monsanto Chemical Company
Organic Chemicals Division 40, 93
Plastics Division 205
Texas Division 12
Mosinee Paper Mills Company .. 115
Moslo Machinery Co. 159
Mount Hope Machinery Company 198
Muehlstein, H., & Co., Inc. 103

National Rubber Machinery Co.. 34
Naugatuck Chemical 113
New England Lacquer Co. 192
New Hermes, Inc. 199
Newark Die Company 217
Northern Industrial Chemical Co. 144
Norton Laboratories, Inc. 44

Orange Roller Bearing Co., Inc., Metalsmiths Div. 170

Parker Stamp Works, Inc., The 133
Peter Partition Corp. 167
Pittsburgh Coke & Chemical Co. 24, 25
Pittsburgh Plate Glass Company, Fiber Glass Division 131
Plastic Molding Corp. 162
Plastic Research Products 183
Plastics Engineering Company .. 23
Porter, H. K., Company, Inc., The Watson-Stillman Co. Division .. 15
Praktica Co., Inc., The 167
Preis, H. P., Engraving Machine Company 168
Presto Lock Co. 197
Projectile & Engineering Company Ltd., The 195

Quinn-Berry Corp. 180

Reed-Prentice Corp. 8
Reichhold Chemicals, Inc. 129
Richardson Company, The 6
Rogers Corporation 48
Rohm & Haas Company. The Plastics Division 35
Resinous Products Division .. 107
Royle, John & Sons 161
Rubber Corporation of America 138
Russell Reinforced Plastics Corp. 22

Schulman, A., Inc. 158
Schwartz Chemical Co., Inc. 190
Shaw, Francis & Company Limited 150
Sheffield Plastics, Inc. 187
Sinko Mfg. & Tool Co. 158
Societa Italiana della Celluloide 19
Sorg Paper Company, The 139
Standard Tool Co. 178
Stanley Chemical Co. 187
Stricker-Brunhuber Corp. 198
Styrene Products Ltd. 219
Summit-Roberts Tool Co. 160
Swedlow Plastics Co. 201
Synthane Corporation 123

Tanney-Costello, Inc. 148
Tennessee Eastman Company .. 99
Thermo Electric Co., Inc. 132
Thermo-Plastic Corporation 178
Timken Roller Bearing Company 53
Transilwrap Co. 136
Tupper Corporation 141

Union Carbide & Carbon Corporation, Bakelite Co. ..... 125, Inside Back Cover
Union Carbide & Carbon Corporation, Carbide & Carbon Chemicals Co. 101

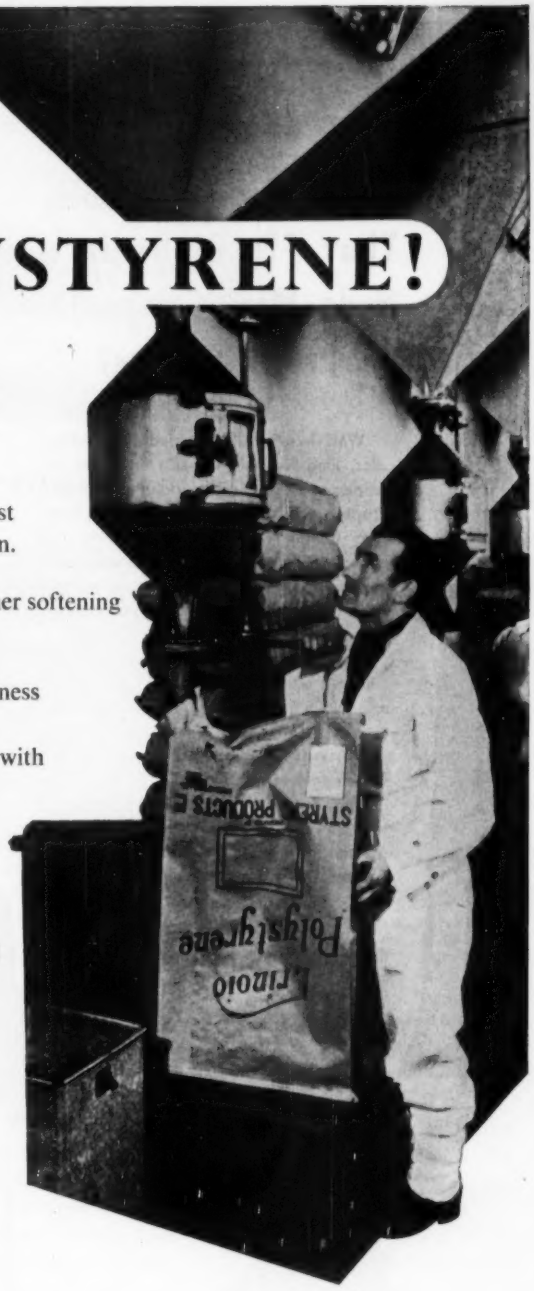
Van Dorn Iron Works Co., The 147

Waterbury Companies, Inc. 152
Watlow Electric Mfg. Co. 137
Watson-Stillman Co., The, Division of H. K. Porter Company, Inc. 15
Wellington Sears Company 14
Westchester Plastics, Inc. 151
Western Felt Works 188
Wiegand, Edwin L., Company ... 191
Windsor, R. H., Ltd. 145
Woloch, George, Products Co. .. 215
Worcester Moulded Plastics Co... 220
World Plastex 149

MODERN PLASTICS

575 MADISON AVENUE • NEW YORK 22, N.Y.

POLYSTYRENE!



For every purpose to which polystyrene can be put there is a special Erinoid grade.

Erinoid **G.P.**—for general low-cost quantity production.

Erinoid **H.S.**—for use when a higher softening point is required.

Erinoid **H.I.**—for increased toughness and mechanical stability, combined with easy moulding.

Erinoid **S.T.**—Beads—specially produced for dry-colouring, extrusion-colouring and direct-injection moulding processes.

ERINOID POLYSTYRENE is backed by a world-wide technical and marketing service. If you're thinking about polystyrene—

Erinoid's the name

STYRENE PRODUCTS LTD

96 PICCADILLY · LONDON · W1 · TELEPHONE: GROSVENOR 7111
MARKETING AGENTS: ERINOID LTD · STROUD · GLOUCESTERSHIRE · ENGLAND · TELEPHONE: STROUD 810

Bright, Rugged Handles That Fit Right Into Hyde Mfg. Company's Profit Picture!

WMP has literally moulded eye-catching color, long life and low cost right into the handles of these durable, useful razor blade scrapers. For the manufacturer, the Hyde Mfg. Company, Southbridge, Mass., this means steady sales, steady production and steadier profits — typical of many a product which has included a WMP custom moulded part.

You can plan on rapid, economical production — and higher sales appeal — of your moulded plastics product, by taking advantage of WMP's skills, facilities and experience. Visit the WMP plant, for a talk with our engineering staff and to see our moulding and metallizing facilities for pieces up to 22½ lbs. See for yourself why "Custom Moulded by WMP" means better-looking, better-selling products — for you.

Courtesy Hyde Mfg. Company, Southbridge, Mass.

WMP

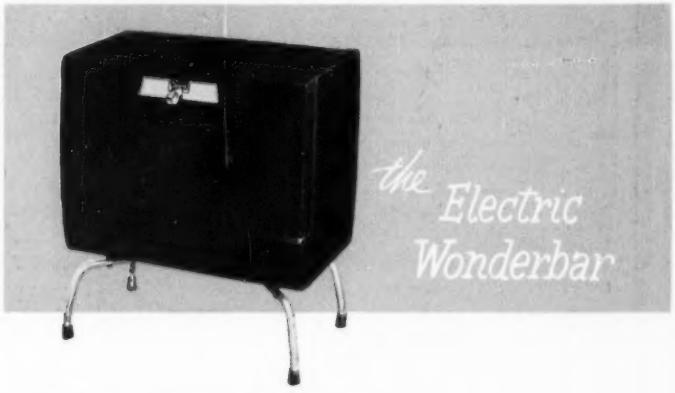
Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

a NEW idea in refrigerators...



a GREAT idea in Phenolic Plastics!

Servel's portable "Wonderbar" travels to any room in the house—parks right at your elbow!

Molded of BAKELITE Phenolic Plastic, the cabinet puts this electric refrigerator in the fine furniture class. With its clean modern lines, rich mahogany color, and permanently smooth finish, it "belongs" in living room, bedroom, or den.

BAKELITE Phenolic Plastics are resistant to stains and abrasion—always look clean. Light in weight, they help make the "Wonderbar" easy to move about. They have good thermal characteristics. They're strong—the "Wonderbar" door opens to form a serving shelf, has to take a lot of slamming. They are quickly molded to the precise dimensions needed for quick assembly and tight sealing.

If you're planning a new product—or bringing an old one up-to-date—try BAKELITE Phenolic Plastics. Our engineers will help you.

Write Dept. OQ—13.

Cabinet molded by General American Transportation Corporation.

BAKELITE

PHENOLIC PLASTICS

TRADE MARK

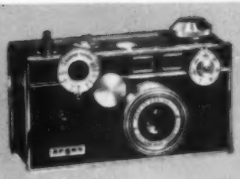
BAKELITE COMPANY

A Division of
Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.



ARGUS C3

ARGUS 75

EASTMAN TABLE VIEWER

BEACON 225

BEACON II

IDEAS IN PLASTICS FROM G.E.'s MOLDING SERVICE

HOW CAN G-E PLASTICS MAKE YOUR PRODUCTS CLICK?

For products that click with the customers, depend on G-E plastics! The jobs shown here, molded by General Electric for some of America's leading camera manufacturers and sold by the hundreds of thousands—tell the story. Smart-looking, compact, lightweight, these items illustrate how plastics can economically mass-produce the parts you need with the sales appeal you want.

Where do plastics fit into *your* sales picture? General Electric's complete molding service is ideally equipped to design, engineer and mold plastics parts to your requirements. Offering far more than just tremendous molding facilities, G.E.'s *complete* service provides *ideas in plastics* that often result in money-saving production short cuts or which impart new beauty, new utility, greater salability to your product.

When you think of plastics, think of General Electric, one of the world's largest plastics molders. For information, just write to General Electric Company, Section 310-1A, Chemical Division, Pittsfield, Massachusetts.

G.E.'s Complete Molding Service Offers You —

- **Complete mold-making facilities**
- **Impartial material selection**
- **Injection presses from 3 to 208 ozs.**
- **Compression presses from 3 to 36 ins.**
- **Complete extrusion facilities**
- **Complete silicone rubber fabricating facilities**
- **Complete molded mycalex facilities**

PLUS the benefit of 60 years' experience in designing, engineering and molding plastics parts.

You can put your confidence in—

GENERAL ELECTRIC